Honeywell

DPR 1500
Digital Process Reporter
Operator's Manual

43-DR-25-01

Honeywell

DPR 1500
Digital Process Reporter

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Process Control Division, 1100 Virginia Drive, Fort Washington, PA 19034

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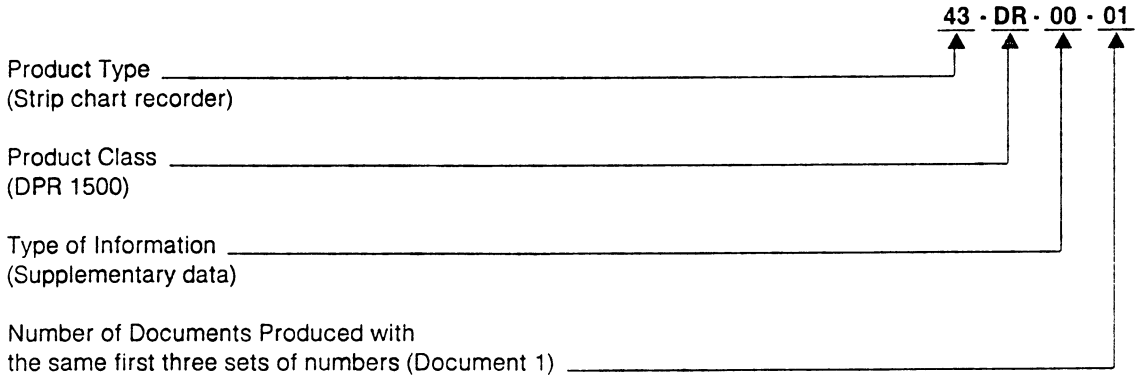
DPR 1500
Digital Process Reporter

Foreword

A Brief Word About the Organization of this Manual

This manual contains installation, preparation, configuration, operating, parts list, service and specification information for the DPR 1500 Digital Process Reporter (the Reporter).

The manual is an assembly of separate documents. Each document is identified by a title and a number. The number consists of four sets of numbers separated by hyphens. For example, the number of this document is 43-DR-00-01. The meaning of each set of numbers is shown in the following diagram.



To find a document easily, look for its title and number in the Table of Contents (Document 43-DR-25-01) for this Product Manual; then skim through the manual to look for the title or number in the upper outside corner of a page. When you find a page with the title or number, turn to page 1 of the document where you will find a Table of Contents to locate specific information.

Training

Honeywell offers a course for maintenance and operating personnel. Course attendees learn to configure, operate and calibrate the Reporter. Also, diagnostic programs and flow charts are used to teach troubleshooting procedures. Please contact the registrar; Honeywell Educational Services, Process Control Division, 1100 Virginia Drive, Fort Washington, PA 19034.

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DPR 1500
Digital Process Reporter

Specification

Function

The DPR 1500 Digital Process Reporter (the Reporter) is a high-speed multichannel, microprocessor-based recorder (Figure 1) that prints on a 250-millimeter (10-inch) calibrated width chart. With microprocessor electronics, four data-presentation formats, and six-color printing, the Reporter expands data gathering capabilities and simplifies evaluation of process data. DPR 1500 features include—

- *user configuration capability* that allows users to modify the Reporter to fit their requirements.
- *one all-purpose chart* that eliminates the need for ordering and stocking several types of charts.
- *six-color printing* that aids in visually evaluating the process status,
- *four recording formats* that provide a choice in the method of data presentation,
- *thirty analog channels* (with built-in signal conditioning) that allow the recorder to monitor process variables from many sensor types,
- *operator-prompting messages* that advise users of process status,
- *eight machine-printed assignable ranges* that provide wide span coverage,
- *alarm flexibility* that provides simple keystroke assignment of alarms to each channel,
- *mixed input capability* that allows users to connect different types of input signals to the recorder in any combination,
- *digital displays* that show channel number, process variable value, and engineering units, and provide operator prompting,
- *optional DMCS communications interface* that provides a communications link between the Reporter and other Honeywell devices using a proprietary protocol,

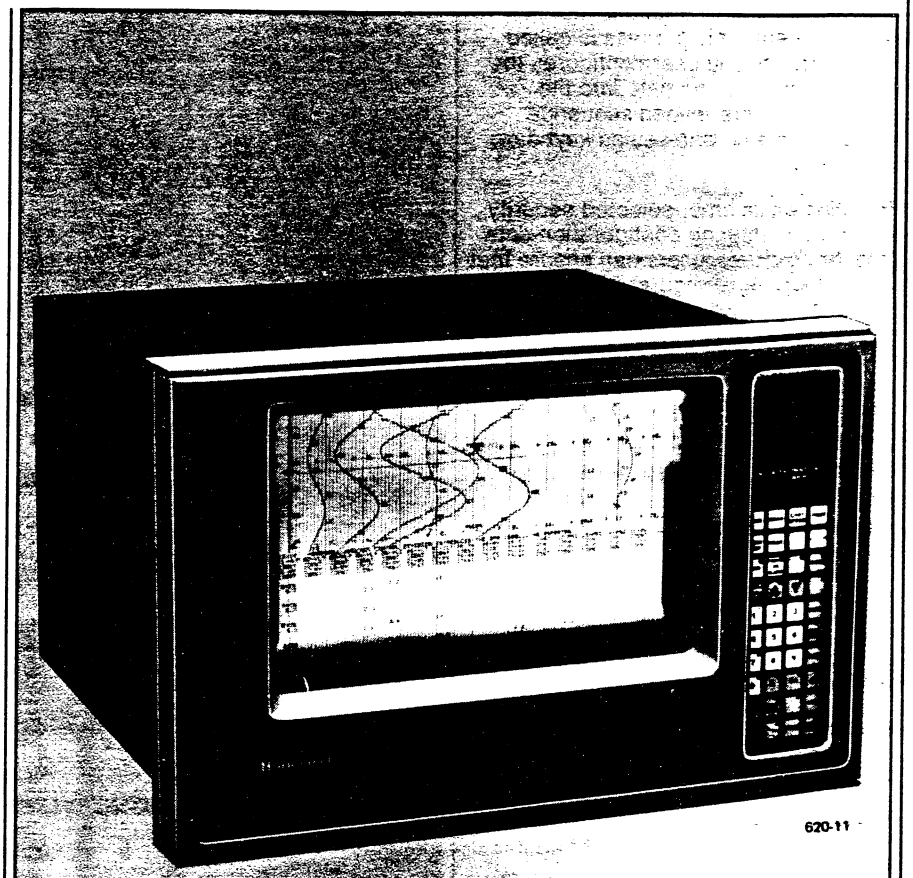

Figure 1 — DPR 1500

- *optional RS-232C communications interface* that provides communications directly between the Reporter and a host computer, using ASCII code transmitted over an RS-232C link,
- *optional math pak feature* that provides the capability of performing any of four mathematical operations on analog input data before it is printed or displayed.

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Configuration

Unlike analog recorders whose capabilities are determined almost entirely by hardware design, the Reporter's capabilities are primarily determined by its software. Honeywell engineers have preprogrammed a variety of functional capabilities into the Reporter to give the user flexibility. The user prepares the Reporter for operation in his application by selecting those functions that best suit his needs. This process is called configuration. The user configures the Reporter by entering data into the Reporter in a predefined sequence through a membrane-sealed keyboard (Figure 2).

By using a customer-selected security code when entering configuration data into the Reporter, users can ensure that the Reporter's configuration is tamper resistant.

As entered, configuration data is shown on the front panel display for verification, and can be printed on demand (Figure 3).

To prevent its loss in the event of a power failure, configuration data is stored in a non-volatile memory. Configuration data include—

- time and date,
- type of input,
- report format,
- chart ranges,
- alarm hysteresis
- alarm set points,
- print groups,
- units of measurement,
- column headings (tabular format),
- operator-prompting messages,
- channel skip,
- chart speed,
- logging interval,
- configuration security code.

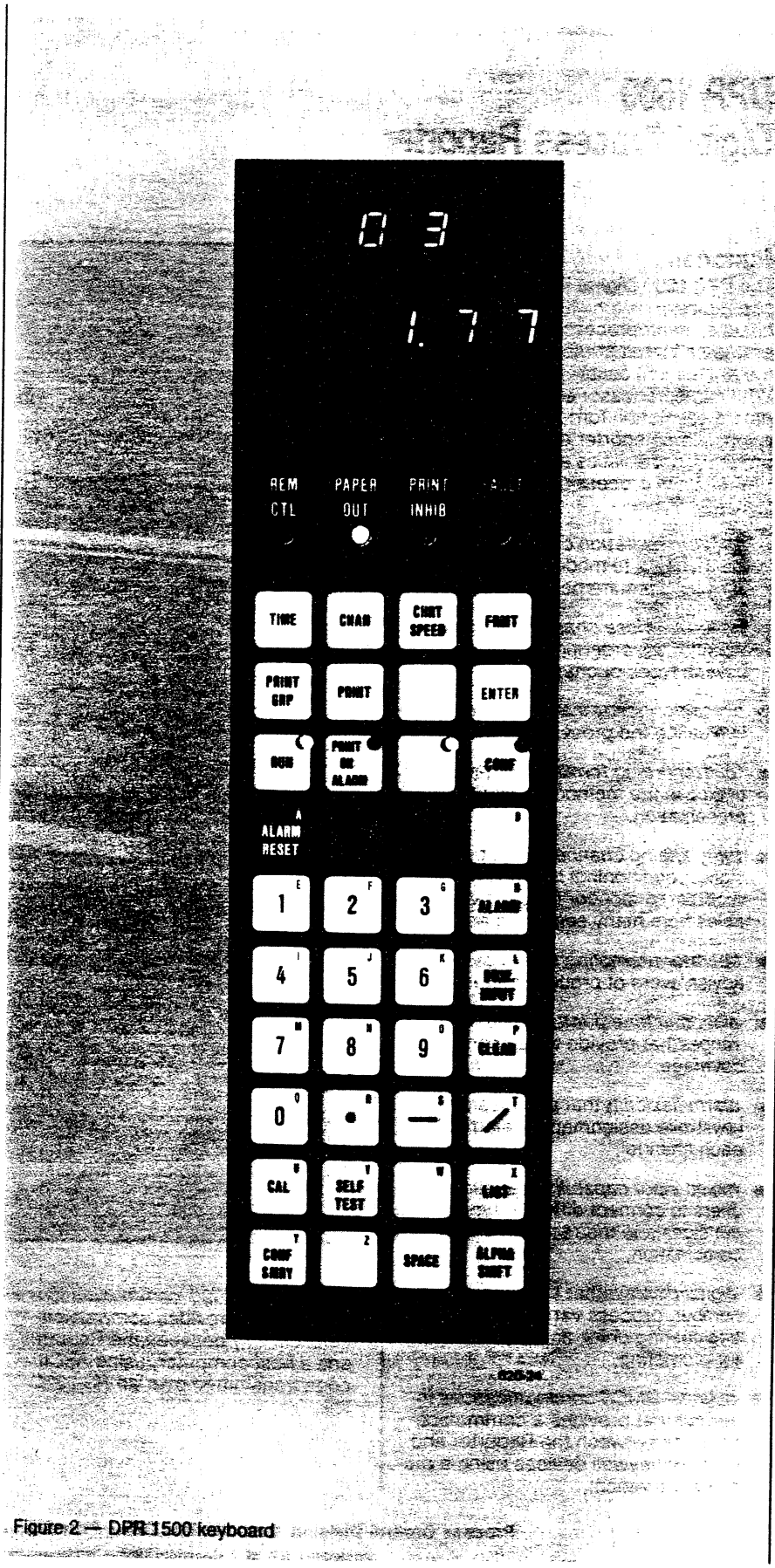

Figure 2 — DPR 1500 keyboard

Reporting Formats

Trend

The trend format shows the value of a process variable input with respect to time (Figure 4).

In the trend format, the user can configure a Lo and Hi "set point" alarm or a negative and positive rate-of-change alarm on each channel. For visual recognition of channels in an alarm status, the Reporter prints an alarm identifying mark and the type of alarm on the chart.

Tabular

In this format, the Reporter logs all process variable values periodically, according to a time interval configured by the user (Figure 5).

The user can select the tabular format manually through the keyboard, or configure the format to be selected through contact closure of an external device connected to a remote switching input.

The user can configure a Lo and Hi set point alarm or a negative and positive rate-of-change alarm on each channel.

This format also includes a 95-character field that can be used for process identification.

Trend with Deviation

This format combines trend and deviation reporting on one chart (Figure 6). The trend record is like that described in the previous section. The deviation record varies about a zero reference point to indicate positive and negative deviations. It shows graphically the difference in value between an input designated as a reference input and one or more process variable inputs selected for comparison with the reference input. The reference input can be a time-varying analog signal supplied externally through the channel one input or a user-designated set point entered through the numeric keyboard.

A Lo and Hi deviation alarm can be configured on any channel which is reporting deviation.

Tabular Deviation

This format is similar to the tabular format described above except it records channels that are reporting deviation.

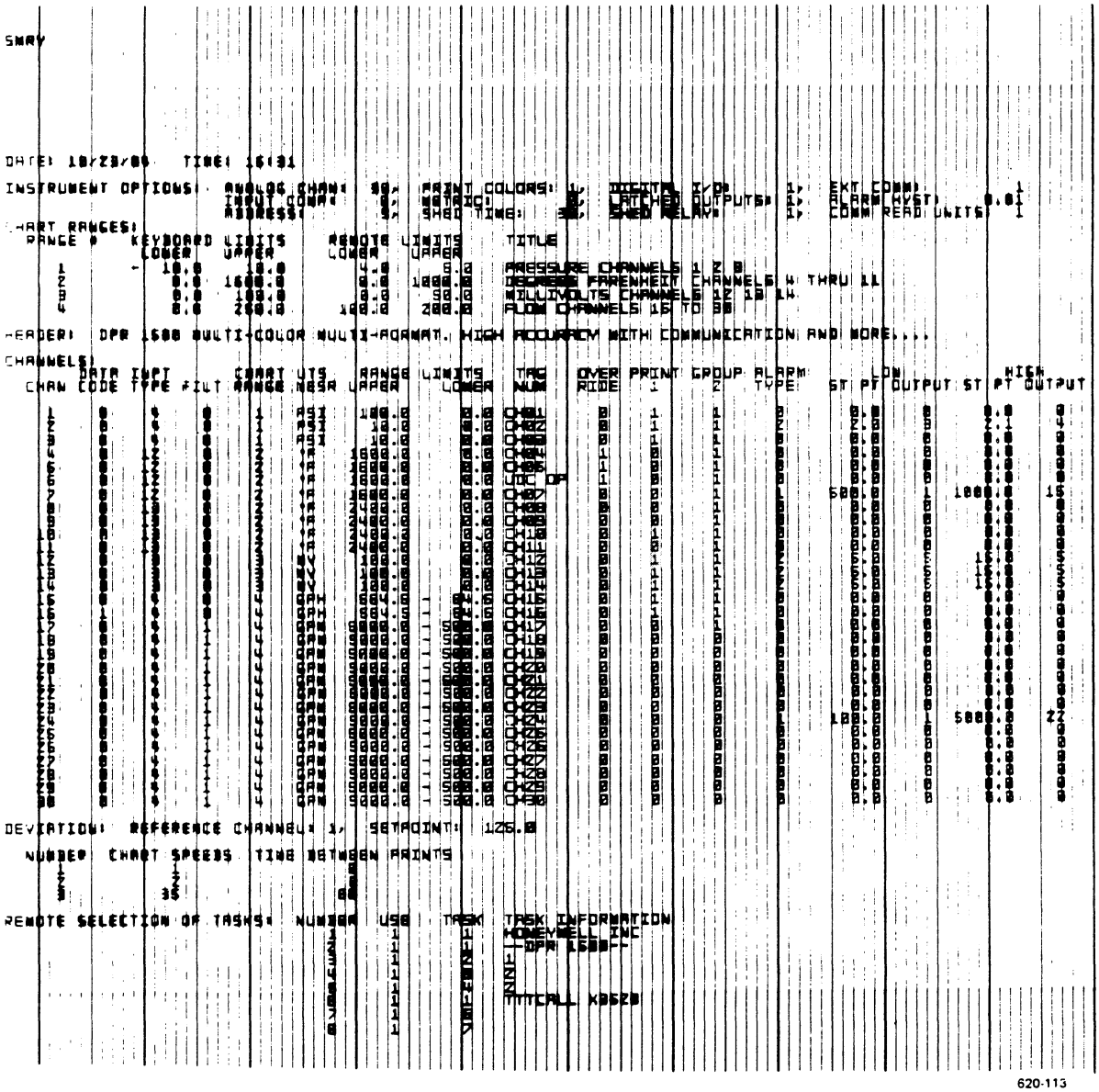

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Figure 3 — Configuration summary

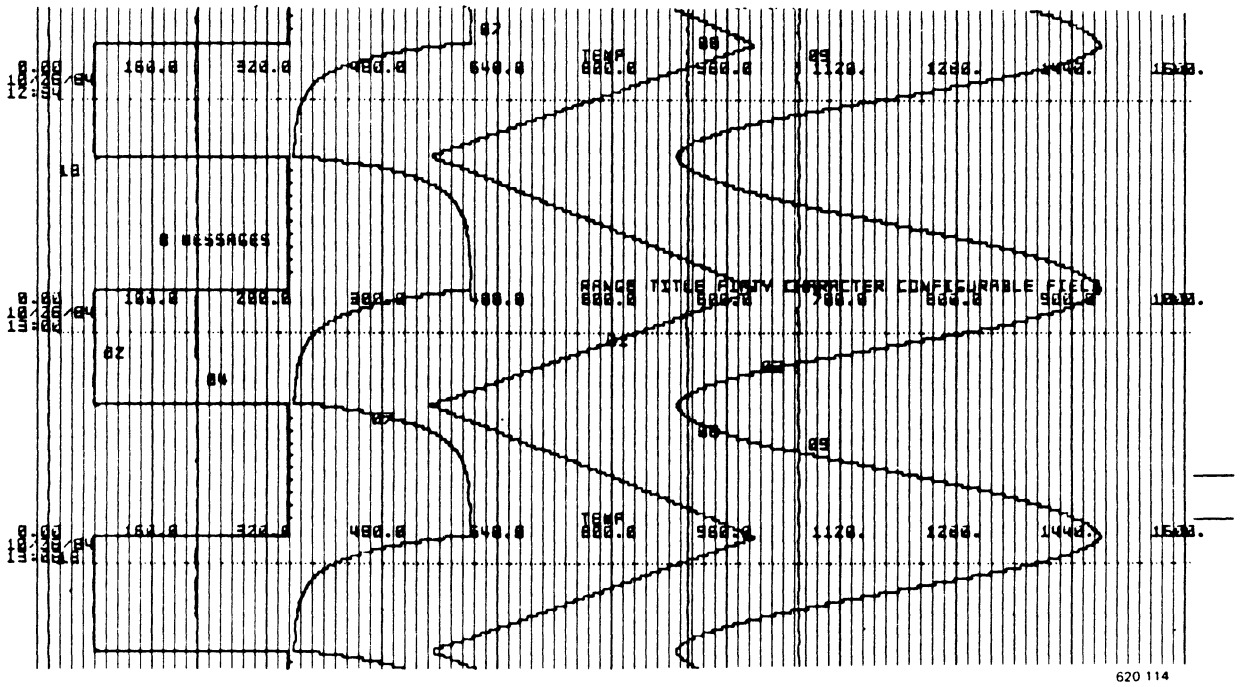

Figure 4 — Trend chart

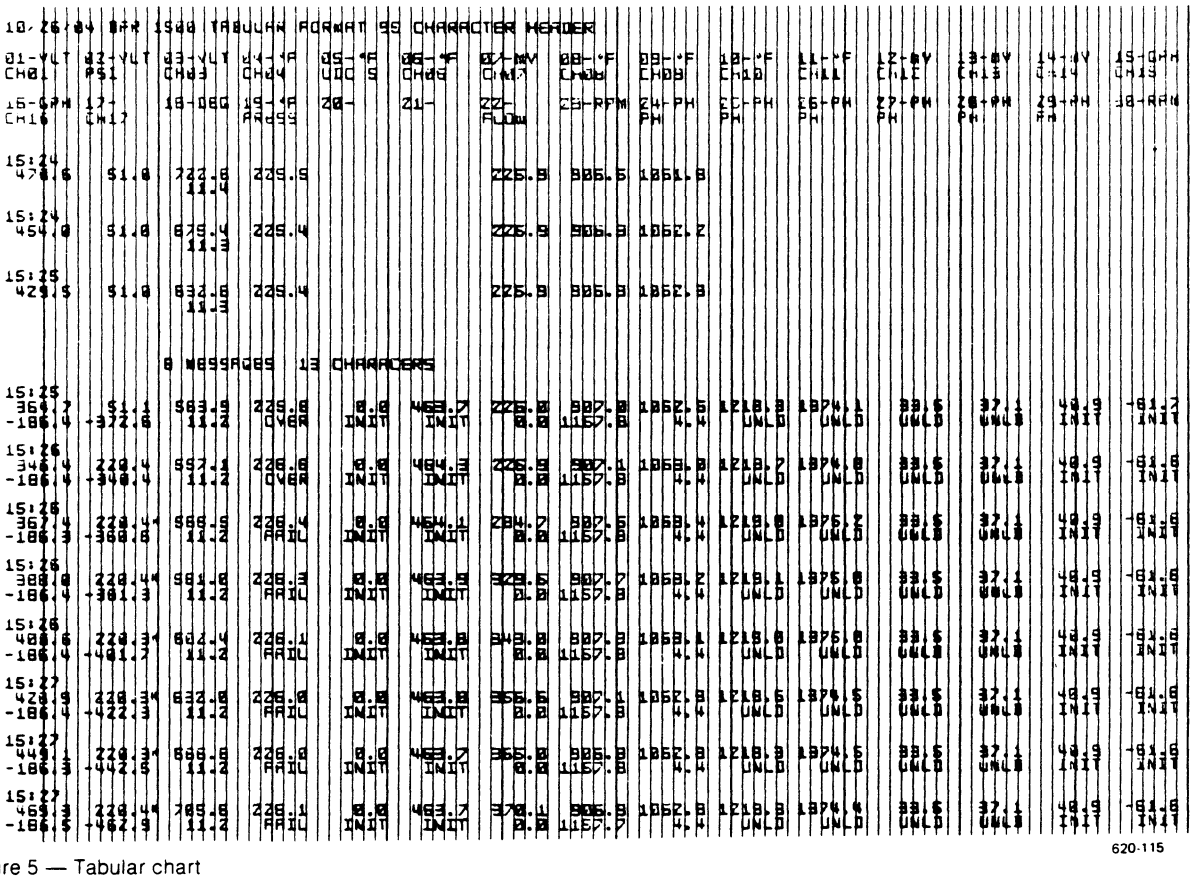

Figure 5 — Tabular chart

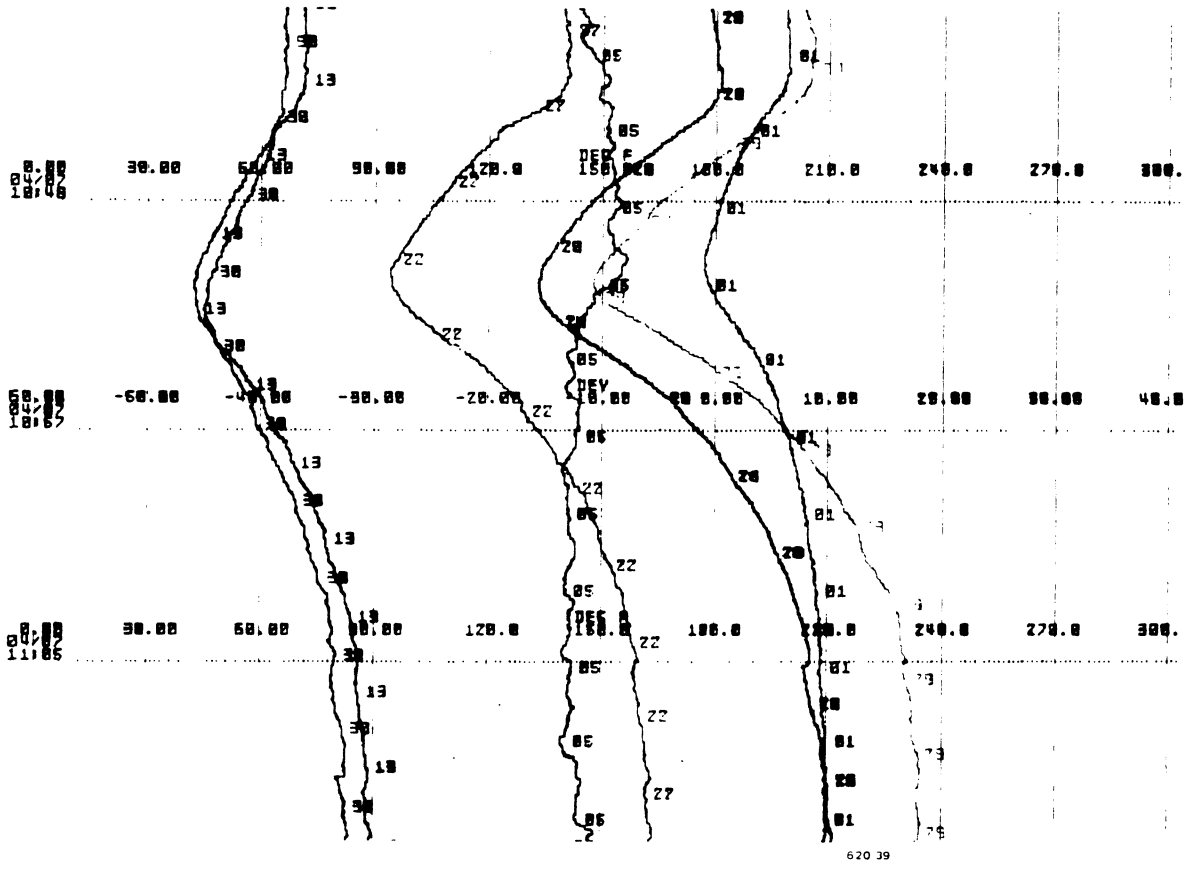

Figure 6 — Deviation chart

Chart

The Reporter uses a uniformly-spaced, 100-division chart (either "plain" or pressure sensitive). This one chart serves all purposes.

Chart paper is perforated at 8-1/2 by 11-inch sections for convenient removal and record storage.

Chart Ranges

The Reporter can be configured for four ranges. The digital I/O option extends the maximum number of ranges to eight and allows remote or internal alarm contact closure to activate a preselected range change.

Any combination of actuation types can be assigned to a range. For example, a J thermocouple and a K thermocouple can be assigned to the same printed range.

Printing

The Reporter uses a dot-matrix printer which gives it the capability to print alphanumeric and graphic characters as well as time and trend lines. The main components of the printing system are the printhead, print wheel, and chart drive.

On Reporters that print in six colors, the printhead presses the chart against ink-filled color wheels to produce the records. On Reporters that print in one color, the print head presses pressure-sensitive paper against a mandril to produce the record. Printing occurs as the printhead moves horizontally in both directions across the page.

The Reporter uses the dot-filled technique from a microprocessor algorithm to produce a continuous trend of a process variable.

Print Speed

The Reporter can print at a maximum rate of 167 characters, per second. However, the chart speed or log interval determines the exact speed at which the Reporter will print. This feature enables the printer to consistently print a time line every two inches on the chart (trend format).

Print Groups

A channel can be configured to be included in one, both, or neither print group. A print group is a set of channels whose records will be printed together. By grouping channels the user can reduce the number of records printed on the chart at one time. The two print groups can be alternately selected for printing either manually by means of the front panel or automatically by means of the remote switching inputs.

Time/Date Printing

A real-time digital clock, powered by a 10-year life battery, controls the Reporter's time and date printing.

Analog Data Acquisition

A single-chip microcomputer controls the processing of analog signal inputs. The Reporter is capable of accepting up to 30 analog inputs. These inputs can be thermocouple, resistance temperature detector (RTD), voltage, and current in any combination. All analog inputs are scanned every five seconds.

Each analog input is signal conditioned and then applied to a dual slope 15-bit, analog-to-digital converter.

The single-chip microcomputer linearizes both RTD and thermocouple inputs and compensates for temperature variations in the thermocouple reference junction.

Alarms

- Set Point
- Rate-of-Change
- Deviation

A user can configure the alarm type as set point or rate-of-change. Depending on the alarm type configured, Lo and Hi alarm set points or negative and positive rate-of-change alarm values are available on a per channel basis. For channels which are reporting deviation, Lo and Hi deviation alarms can be configured in engineering units. Deviation alarms activate when an assigned input value deviates from a reference value more than a preassigned limit. This reference value can be either a set point that the user configures into the Reporter or the input of channel one. A user can also configure an alarm hysteresis value in percent of span.

For channels in an alarm status, the Reporter prints an alarm identifying mark and the type of alarm on the chart. On Reporters with the digital I/O option, alarms can be configured to activate external devices.

Print on Alarm

The user can operate the Reporter so that it prints a record only when an alarm set point value is exceeded.

Alarm Reset

The user can configure alarms to be manually reset via the "ALARM RESET" key or reset via the remote switching inputs.

Digital I/O Option

This option increases the versatility of the Reporter by providing an interface between the Reporter and devices that are external to it.

Output Relays

With the digital I/O option, the Reporter comes equipped with six, single-pole, double-throw output relays. The user can configure any of these relays to be actuated by an alarm circuit. An external device connected to the contacts of any of these relays is controlled by the alarm circuit.

The user can also connect the alarm relay outputs to the remote switching inputs of the Reporter. This connection allows alarms to control the Reporter's remote switching functions.

Remote Switching

The digital I/O option also includes input terminals which allow the user to connect as many as eight external on-off contact devices to the Reporter. With this feature the external contacts serve as digital inputs to the Reporter and can be used to

- change the range,
- change the chart speed or log interval,
- print on demand/inhibit printing,
- change the print group,
- reset the alarms,
- change the printing format,
- print messages.

Message Printing

With the digital I/O option, the user can configure as many as eight 13-character messages to alert the user that some pre-specified event has occurred, or to annotate the chart for quality control purposes. Time can be included in the message field to document the moment of an event occurrence. Printing is activated by a contact closure.

DMCS Communications Interface Option

This option equips the Reporter for use on the Honeywell Serial Link so a host computer can communicate with it through Honeywell's Gateway. Gateway gives a host computer data acquisition and remote control capabilities. For example, the host computer can retrieve channel values from a Reporter, and change the print format of a Reporter. See the Gateway specification 82-50-02-02 for more information.

RS-232C Communications Interface Option

This option equips the Reporter for use with a computer via an RS-232C transmission link. This gives a host computer data acquisition and remote control capabilities without the use of any intermediate device. For example, the computer can monitor and control selected operations at the Reporter.

Math Pak Option

This option allows the Reporter to perform any of four mathematical operations on analog input data before it is printed or displayed. These operations are square root, sterilization time, general arithmetic functions, and group averaging.

The square root function is a calculation performed on the data on a specific analog channel.

The sterilization time function is a calculation which provides the equivalent sterilization time based on food processing lethality rates.

The general arithmetic function accommodates special situations by allowing the results of previously computed functions to be used as inputs to a more complex equation.

The group averaging function computes the average value of a group of selected channels over each analog scan interval.

Input Channel Compensation

A configurable feature called input channel compensation lets a user compensate a given input for sensor inaccuracies or, in effect, "zero" the sensor error.

Also, this feature permits the equivalent of set point deviation on a per channel basis.

Calibration

To calibrate, the user puts the Reporter into the configuration mode, connects the calibration reference, and presses the CAL and ENTER keys.

In the "RUN" mode, the Reporter automatically checks calibration against an internal reference and corrects zero and span every 30 seconds.

Diagnostics

The Reporter has three independent self-diagnostic systems:

Power-up self-diagnostics,
LED self-diagnostics,
Keyboard/Display self-diagnostics.

Power-up self-diagnostics is a microprocessor-controlled diagnostic program that runs tests on selected circuitry when the Reporter is powered up.

Most of the Reporter's printed circuit boards have two or more diagnostic LED's that continuously monitor vital circuit voltages.

A "SELF-TEST" key on the front panel allows the user to initiate on demand a self-diagnostic routine that checks the keyboard and front panel LED's.

Construction

The Reporter is housed in a metal case which can be rack or panel mounted. A sliding chassis makes servicing easier. The chassis is accessible through a gasketed, die-cast aluminum door.

Process Interface

Power, input, and output wiring connect to terminal blocks at the rear of the case. Isothermal terminal blocks prevent temperature differences at the point of connection. The terminals, which are numbered, accept wire sizes up to No. 12 AWG.

Specifications

Performance

Number of Channels 14, 22, or 30.

Input Type	Range °F	Range °C	Display Resolution ± °F	Display Resolution ± °C	Reference Accuracy 72°F ± 5° ± °F	Reference Accuracy 22°C ± 3° ± °C	Temperature Stability 58 to 104°F 15 to 40°C ± °F/°C
Thermocouples							
B	105 to 150	40 to 66	7	4	72	40	11.6
	150 to 500	66 to 260	3	2	30	17	5.0
	500 to 1000	260 to 535	1	1	11	6.0	1.67
	1000 to 3300	535 to 1815	1	1	3.3	1.8	0.5
E	0 to 1800	− 18 to 982	0.2	0.1	1.25	0.7	0.22
J	0 to 1600	− 18 to 870	0.1	0.1	0.9	0.5	0.06
K	0 to 2400	− 18 to 1315	0.5	0.3	0.9	0.5	0.16
Ni-Ni Moly	32 to 500	0 to 260	0.5	0.3	1.5	0.83	0.30
	500 to 2500	260 to 1371	0.5	0.3	1.0	0.55	0.25
R	0 to 500	− 18 to 260	2	1	3.3	1.8	0.56
	500 to 3100	260 to 1704	1	1	1.8	1.0	0.30
S	0 to 500	− 18 to 260	2	1	3.3	1.8	0.56
	500 to 3100	260 to 1704	1	1	1.8	1.0	0.30
T	− 300 to 700	− 184 to 370	0.1	0.1	0.9	0.5	0.11
	0 to 600	18 to 316	9	5	9	4	
W_5W_{26}	600 to 3600	316 to 1982	1	1	3.3	1.8	
	3600 to 4200	1982 to 2316	2	1	4.0	2.2	
Platinum RTD							
100 ohm JIS Alpha 0.003916	—300 to 900	—184 to 482	0.1		0.9	0.5	0.1
100 ohm IEC Alpha 0.00385	—300 to 900	—184 to 482	0.1		0.9	0.5	0.1
Nickel RTD							
50 ohm (Edison 2 curve)	− 100 to 600	− 73 to 315	0.2	—	3.0	1.5	0.3
Pyrometers							
RH Radiamatic	2600 to 3400	1427 to 1871	1	1	3.0	1.5	0.3
	2100 to 2600	1149 to 1427	1	1	6.0	3.0	0.5
	1400 to 2100	760 to 1149	1	1	25	13	2.0
Land	1750 to 2750	954 to 1510	1	1	1	0.5	0.75
	1450 to 1750	788 to 954	1	1	5	2.5	4.0
	1200 to 1450	649 to 788	1	1	38	15	24.0
Millivolts (dc)	0 to 20		1 μV		± 10μV		1.5 μV/°C
	0 to 50		2 μV		± 25μV		3.5 μV/°C
	0 to 100		4 μV		± 100 μV		7 μV/°C
Volts (dc)	0 to 10		0.3 mV		± 1mV		0.75 mV/°C
Milliamperes	4 to 20 (1-5 V)		0.1 mA		± 10 μA		1.5 μA/°C

Specifications

Performance

Input Impedance	20 megohm minimum on all *voltage* ranges 250 ohms on 4-20 *milliampere* range
Stray Rejection	*Common Mode* *AC: (50 or 60 Hz):* 120 db (with maximum source impedance of 10 ohms and maximum voltage of 120 Vac) or ± 1 LSB (least significant bit) whichever is greater *DC:* 120 db (with maximum source impedance of 10 ohms and maximum voltage of 240 Vdc) or ± 1 LSB, whichever is greater† *DC to 1 Kz:* 80 db (with maximum source impedance of 10 ohms and maximum voltage of 50 Vac) or ± 1 LSB, whichever is greater *Normal Mode* *AC (50 to 60 Hz):* 60 db (with 100 percent span peak-to-peak maximum)
Error Due to Source Resistance	*Without burnout:* 3 nV/ohm *With burnout:* 0.6 μV/ohm
Printing Colors	*Six-color:* red, green, blue, purple, orange, and brown *One-color:* purple (pressure-sensitive paper)
Chart Speeds	*Six-color:* 35 inches/hour maximum *One-color.* 100 inches/hour maximum
Chart Length	Plain paper: 122 ft.; pressure sensitive paper: 83 ft.
Alarm Relay Rating	Contacts rated at 2 amperes @ 120V resistive; 0.5 amperes @ 240V resistive
Input Filter	*Analog:* single pole RC low pass filter — 12.4 db attenuation of 60 Hz. *Digital:* weighted average filter
Input Sampling Rate	Inputs sampled once every 5 seconds
Temperature Non-uniformity of Input Terminals	± 0.5°C Maximum
Communications Interface	Honeywell DMCS Link or Electronics Industries Association (EIA) RS-232C Link ***Honeywell DMCS Link*** *Baud rate:* 19,200 baud *Length of link:* 2000 ft. maximum *Link characteristics:* Two-wire, multidrop proprietary protocol ***EIA RS-232C Link*** *Baud rates:* User-configurable at 110, 300, 600, 1200, 2400, 4800, 9600, and 19,200 baud. *Length of link:* 50 ft. maximum *Link characteristics:* Link uses cable containing minimum of eight conductors. Cable terminated in standard RS-232C type, 25-pin "D" connector

†120 Vdc is maximum voltage for 20 mV range.

Operating Conditions and Design Limits

	Reference Conditions	**Rated Conditions**	**Operative Limits**	**Transportation and Storage**
Ambient Temperature	22 ± 1°C 72 ± 5°F	15 to 40°C 59 to 104°F	0 to 60°C 32 to 140°F	—40 to 66°C —40 to 151°F
Relative Humidity	10-55*	10-90*	5-90*	5-95*
Vibration				
Frequency (Hz)	0	0 to 70	0 to 200	0 to 200
Acceleration (g)	0	0.1	0.2	0.5
Mechanical Shock				
Acceleration (g)	0	1	5	20
Duration (ms)	0	30	30	30

* The maximum % RH shown only up to 40°C (104°F); for higher temperatures, maximum % RH needed to maintain a maximum of 400 grains per pound of dry air.

Specifications

Operating Conditions and Design Limits (Continued)

	Reference Conditions	Rated Conditions	Operative Limits	Transportation and Storage
Voltage (Vac)	100 ± 1	85 to 110	85 to 110	—
	120 ± 1	102 to 132	102 to 132	—
	200 ± 2	170 to 220	170 to 220	—
	220 ± 2	187 to 242	187 to 242	—
	240 ± 2	204 to 264	204 to 264	—
Frequency (Hz)	50	49 to 51	48 to 52	—
	60	59 to 61	58 to 62	—
Power Consumption	*Idling:* 55 Watts *Printing:* 115 Watts			
Permissible Mounting Angle from the Vertical (side to side and front to back)	± 0°	± 5°	± 10°	Any

Physical Characteristics

Weight	76 lbs.
Mounting	Panel or 19-inch relay rack
Wiring Connections	All connections made at rear of case — isothermal terminal blocks for analog inputs, screw terminals for all other connections
Dimensions	(See Figure 7.)
Color	Black case, Carribean blue door and bezel

Dimensions: millimetres / inches

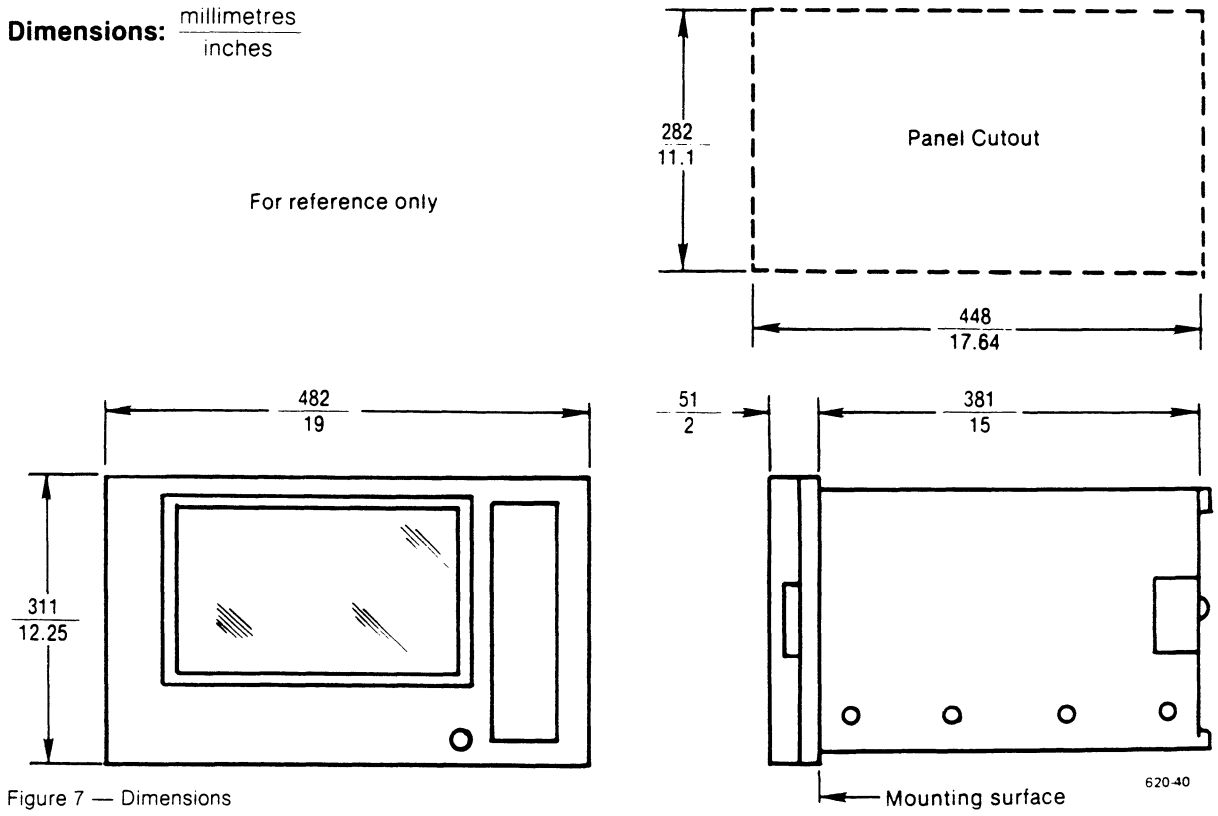

Figure 7 — Dimensions

Specifications

General Reference Data

Static Charge	*Susceptibility:* exposed surface capable of withstanding a discharge through 100 ohms from a 250pf capacitor charged to 10 kV with no component failures or incorrect outputs.
Radio Frequency Interference (RFI)	*Susceptibility:* capable of withstanding RFI field strengths per SAMA specification PMC 33.1 class 1 band A, B, and C with an analog effect no greater than 0.5 percent.
Line Noise Effects	Field terminal and powerline terminals capable of withstanding IEEE Surge Withstanding Capability (SWC) Test with no component failures and no incorrect outputs
Print Head Life	300 million characters typical

Ordering Information

Order the Digital Process Reporter by model number consisting of the key number and table selections desired. The model number has the following structure:

Key Number—Table 1—Table II—Table III

Use the model selection guide below to construct the model number.

For example: DR1301-0-126-04, describes a DPR 1500 Digital Process Reporter, single-color printing, 30 inputs, no RTD actuations, 120 Vac, 60 Hz operation, with door lock.

Honeywell offers a full line of sensors, transmitters, and final control devices for use with the DPR 1500 Digital Process Reporter. These devices include

Thermocouples, RTDs,
Pressure Transmitters,
Flow Transmitters,
Liquid Level Transmitters,
Valves, Actuators, and Electric Motors.

For more information,

Contact your nearest Honeywell Branch Office or
Honeywell Inc.
1100 Virginia Dr.
Fort Washington, PA 19034

In Canada,
Honeywell Limited
155 Gordon Baker Road
Willowdale, Ontario M2H 3N7

Specifications are subject to change without notice.

DPR 1500 Digital Process Reporter—Model Selection Guide

Key Number

Type	Analog Channels	Selection	Availability	
Single color	14 22 30	DR1141 DR1221 DR1301	↓ ↓ ↓	
Six-color	14 22 30	DR6141 DR6221 DR6301		↓ ↓ ↓
TABLE I				
Actuations	Without RTD With RTD	0 1	• •	• •
TABLE II				
Operating Voltage (AC)	120 220 100 200 240	12 __ 22 __ 10 __ 20 __ 24 __	• • • • •	• • • • •
Frequency (Hz)	50 60	__ __ 5 __ __ 6	• •	• •
TABLE III				
No Selection		00	•	•
Door Lock and Keyboard Cover		04	•	•
Digital I/O		02 } Only	•	•
Digital I/O with DMCS Communications		03 } 1	•	•
Digital I/O with RS-232C Communications		06 } from	•	•
DMCS Communications		08 } this	•	•
RS-232C Communications		10 } group	•	•
Math Pak (Basic)		70	•	•
Sterilization Time		71	•	•
General Equation		72	•	•
Square Root		73	•	•
Group Averaging		74	•	•

DPR 1500
Digital Process Reporter

Technical Data

Introduction

The DPR 1500 Digital Process Reporter (The Reporter) is a user-configurable, high-speed, multi-channel, microprocessor-based recorder (Figure 1). It accepts analog data from thermocouple, voltage, current, and resistance temperature detector (RTD) inputs in any combination, and can record data in four different formats. The Reporter is capable of controlling external devices through six output relays and can be remotely controlled itself through eight remote switching inputs. The front panel contains a membrane-sealed keyboard for entering data and operating the recorder as well as LED displays for displaying channel numbers, process variable values, and engineering units. Several self- diagnostic systems enable the Reporter to detect errors within its circuitry.

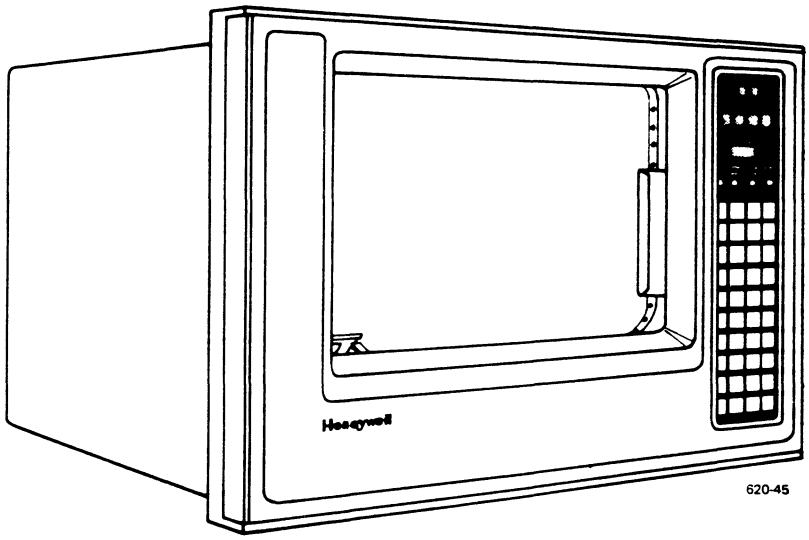

Figure 1 — DPR 1500 Digital Process Reporter

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General Description

The DPR 1500 Digital Process Reporter consists of two major subsystems: the electronic subsystem and the electromechanical subsystem.

The electronic subsystem (Figure 2) consists of the transformer/filter assembly, analog to digital (A/D) board, expansion multiplexer board(s), central processing unit (CPU) board, display board, keyboard, digital input/output (I/O) board, relay terminal board, and power supply/print control board.

The electromechanical subsystem (Figure 3) consists of a color change clutch (six-color models), chart motor, scan motor, nine-wire dot-matrix print head, overrun switch, paper-out switch, and reference sensor.

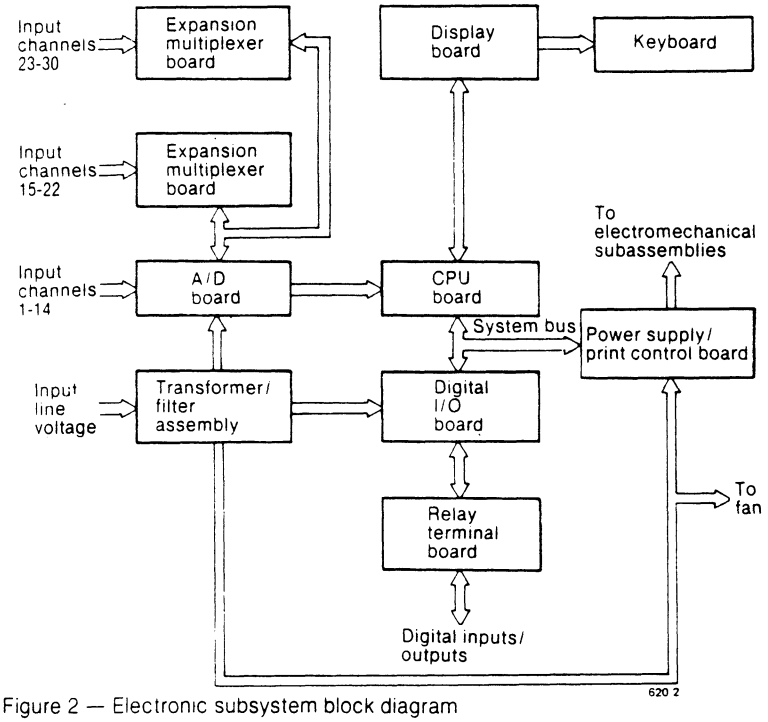

Figure 2 — Electronic subsystem block diagram

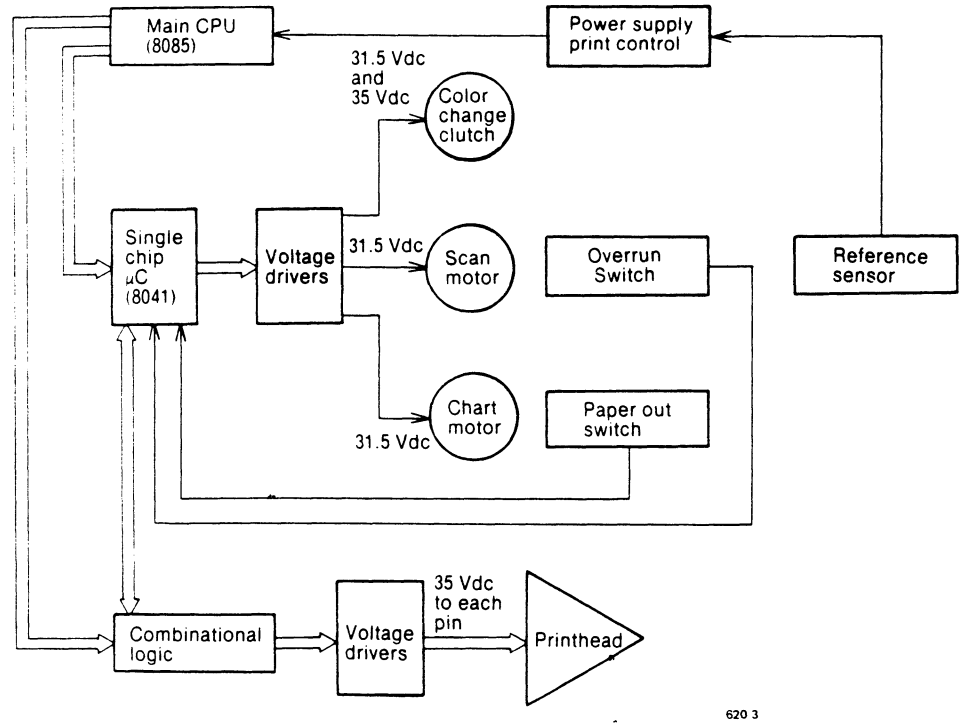

Figure 3 — Electromechanical subsystem functional block diagram

Operating Principles

Electronic Subsystem

Transformer/Filter Assembly

The Transformer/Filter Assembly (Figure 4) transforms the ac line voltage into several ac and dc voltages needed by the various electronic circuit boards and electromechanical devices for proper operation.

The ac power line voltage is applied to the Transformer/Filter Assembly input. This voltage is then filtered, fused, and applied to transformers T1 and T2. T1, a linear transformer, supplies separate ac voltages directly from its secondary windings to the A/D and I/O boards. T1 also supplies voltage to a bridge rectifier which, in turn, supplies a capacitor-filtered, unregulated dc voltage to the PS/PC board.

Transformer T2, a ferro resonant transformer, maintains a relatively constant secondary voltage — even when its primary is undergoing voltage fluctuations T2 supplies ac voltages to the inputs of two full-wave bridge rectifiers. Each rectifier, through a capacitor input filter and a bleeder resistor, supplies an unregulated dc voltage to the PS/PC board.

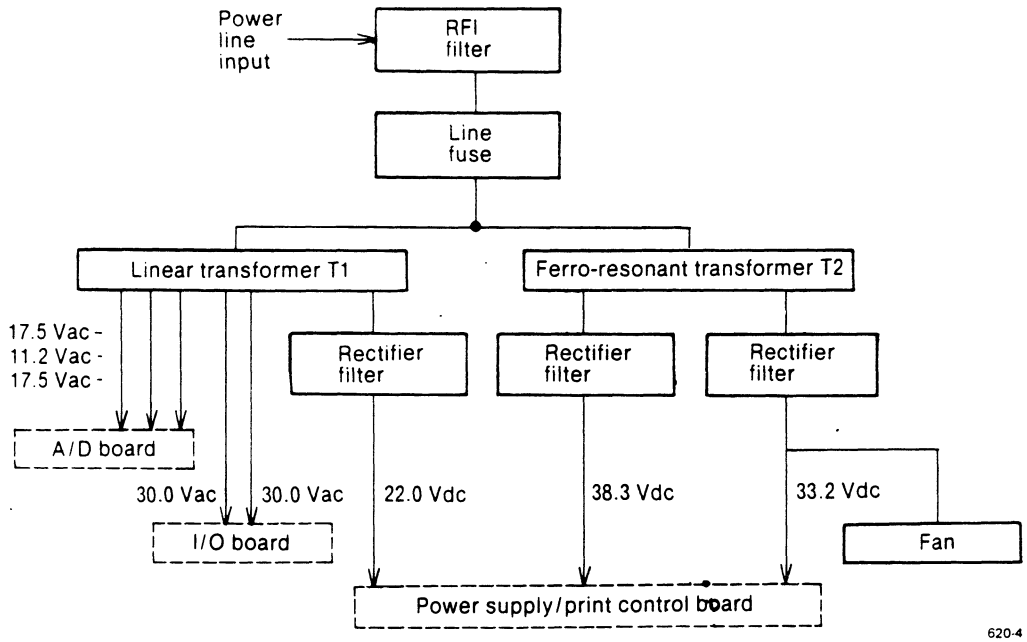

Figure 4 — Transformer/filter assembly functional block diagram

Analog/Digital (A/D) Board
The A/D board (Figure 5) uses multiplexing and dual slope A/D conversion to convert analog data into corresponding digital values for processing by the main CPU. A microcomputer located on the A/D board (with additional external RAM) works in conjunction with the main CPU to control all A/D board functions.

The A/D board includes 16 channels: 14 input channels, 1 zero-voltage channel, and 1 ambient temperature sensor channel. Each expansion multiplexer board provides eight additional channels for a maximum total of 30 input channels.

The main CPU tells the A/D microcomputer which input channel to activate and for what range of values the channel is configured. The A/D microcomputer activates the appropriate channel by energizing a low thermal EMF reed relay. If the activated channel is used with an RTD device, the microcomputer activates a CMOS switch and the third wire RTD relay to compensate for lead wire resistance. Then the A/D microcomputer programs the programmable gain amplifier according to configuration data, and begins the A/D conversion.

The zero voltage channel and an internal voltage reference are used to autocalibrate the five calibration ranges. Calibration range data is used by the A/D microcomputer to compensate each analog input channel for drift immediately after the internal counter has generated the corresponding digital value for an analog input.

The A/D microcomputer receives ambient temperature data from the ambient temperature channel. It uses this data to provide cold junction compensation of channels with thermocouple inputs.

All input data is stored by the A/D microcomputer to be read by the main CPU.

Each calibration range is autocalibrated, and the ambient temperature is sensed once every six channel cycles.

Using the ac voltage supplied to it from the Transformer/Filter Assembly, the A/D board rectifies and regulates this voltage to provide the dc operating voltages used by the A/D and expansion multiplexer boards.

Diagnostic circuitry on the A/D board monitors relay coil current, A/D power supplies, A/D microcomputer ROM and RAM, and the A/D-CPU communications link. If any of these circuits or functions fail, the A/D microcomputer alerts the main CPU during initialization.

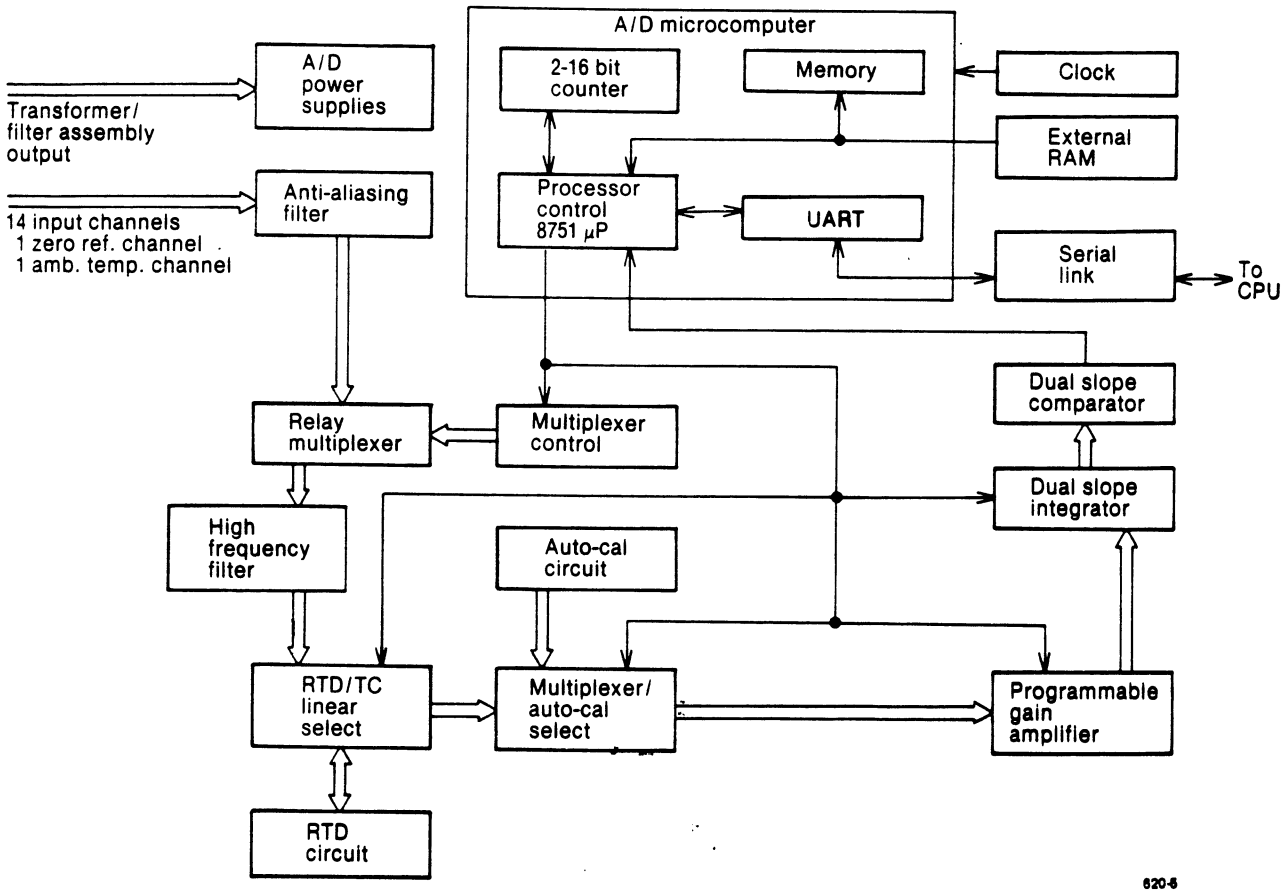

Figure 5 — A/D board functional block diagram

Expansion Multiplexer Board Assembly

The expansion nultiplexer board (Figure 6) provides eight additional analog input channels for the Reporter. Each Expansion Multiplexer Board consists of eight low-thermal EMF reed relays with their associated circuitry. As many as two of these boards can be added to the basic Reporter to give a total of 30 analog input channels.

The A/D board provides power, control, and diagnostics for the expansion multiplexer board.

When an expansion multiplexer relay is activated by the A/D microcomputer, that channel's input signal is delivered to the A/D board for processing and conversion.

Central Processing Unit (CPU) Board

The heart of the CPU board (Figure 7), and of the Reporter itself as well, is an 8085 microprocessor. Driven by a +5 Vdc regulated supply from the PS/PC board and a 6.144 Mhz clock crystal located on the CPU board, the microprocessor directly communicates with a test ROM, diagnostic circuitry, watchdog timer, and system buffers.

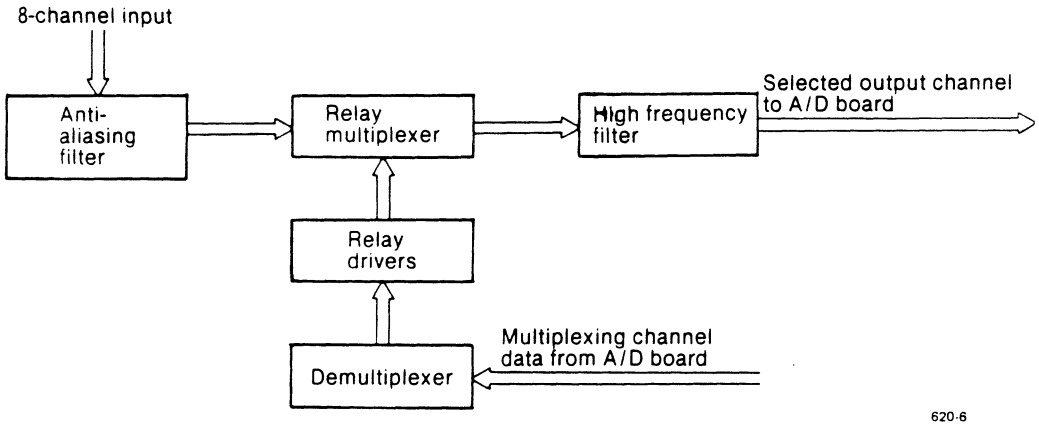

Figure 6 — Expansion multiplexer board functional block diagram

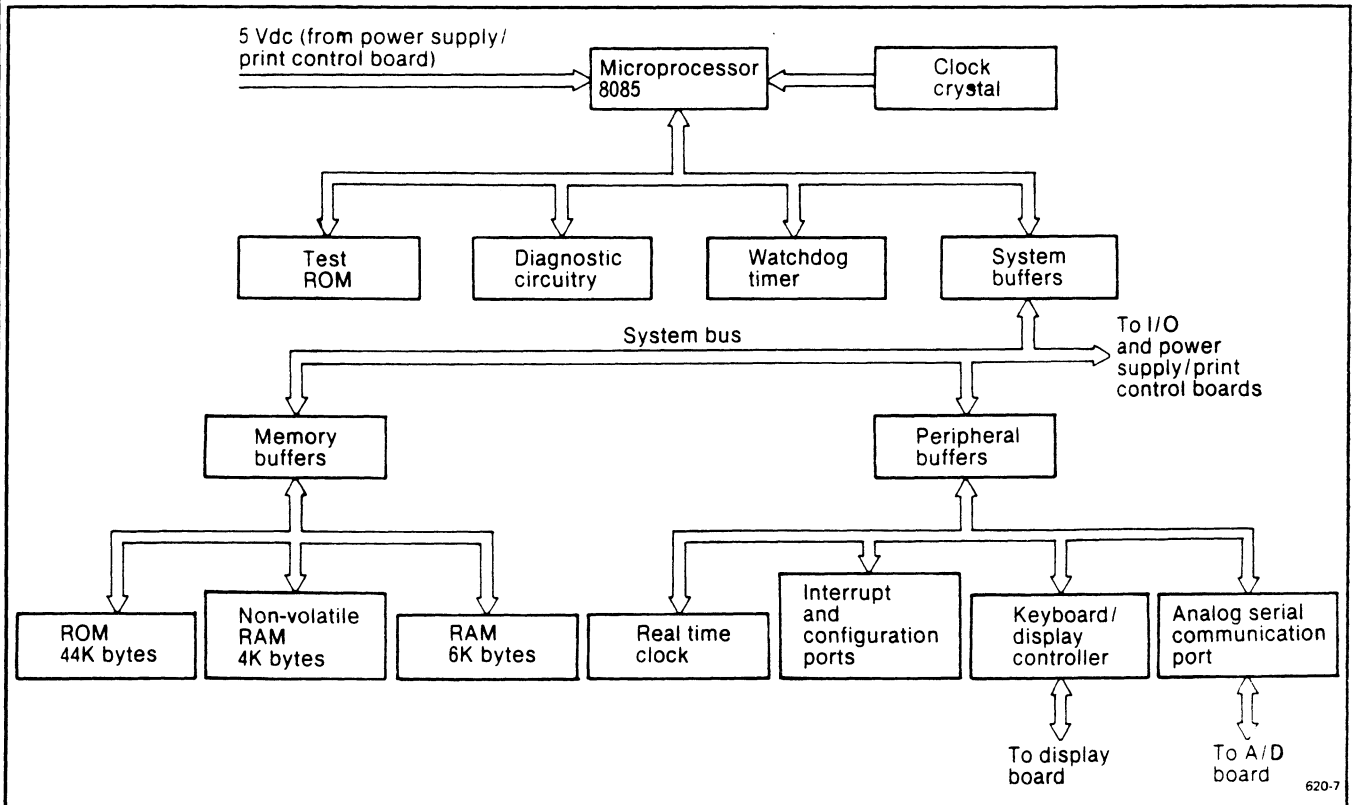

Figure 7 — CPU functional block diagram

Test ROM

Diagnostics are run each time the Reporter is powered. The test ROM provides diagnostics for the entire CPU block of ROM and RAM. To test ROM and RAM requires only that the microprocessor, test ROM, clock crystal, +5 Vdc supply, and reset are functional. If the test ROM diagnostics detect a failure, red LED DS3 will not go out.

Diagnostic Circuitry

If the test ROM diagnostics are run successfully, the CPU uses the entire RAM/ROM block to diagnose the other circuitry within the Reporter.

Watchdog Timer

A watchdog timer monitors software activity. If the microprocessor does not signal the watchdog timer every 110 milliseconds, the Reporter is automatically reset.

System Buffers

The microprocessor communicates with the memory and peripheral buffers through the system buffers.

The memory buffers access 44K bytes of ROM, 6K bytes of RAM, and 4K bytes of non-volatile memory. Non-volatile memory includes 2K bytes of battery backed RAM used for frequently changing data such as machine state parameters required for power loss recovery and 2K bytes of EEPROM used to store infrequently changing data such as configuration data. The EEPROM is driven by a 24 Vdc switching supply and control logic located on the CPU board.

The peripheral buffers on the CPU board access a real time clock which continues to operate with the Reporter off through a Lithium battery.

The peripheral buffers also access the interrupt and configuration ports. These two ports are on a single integrated circuit. One port monitors the CPU configuration switch settings. The other port monitors interrupts from the analog communication link, external communication link, keyboard, real time clock, and 96 Khz clock, as well as two interrupts from non-volatile memory.

The peripheral buffers access the keyboard/display controller on the CPU board. This controller uses data from the microprocessor to refresh the displays and monitor the keyboard.

Finally, peripheral buffers access the analog serial communications port. This port along with the peripheral buffers and system buffers is used to communicate between the microprocessor on the CPU board and the microcomputer on the A/D board.

The microcomputer also communicates with the Input/Output and Power Supply/Print Control boards through the system buffers.

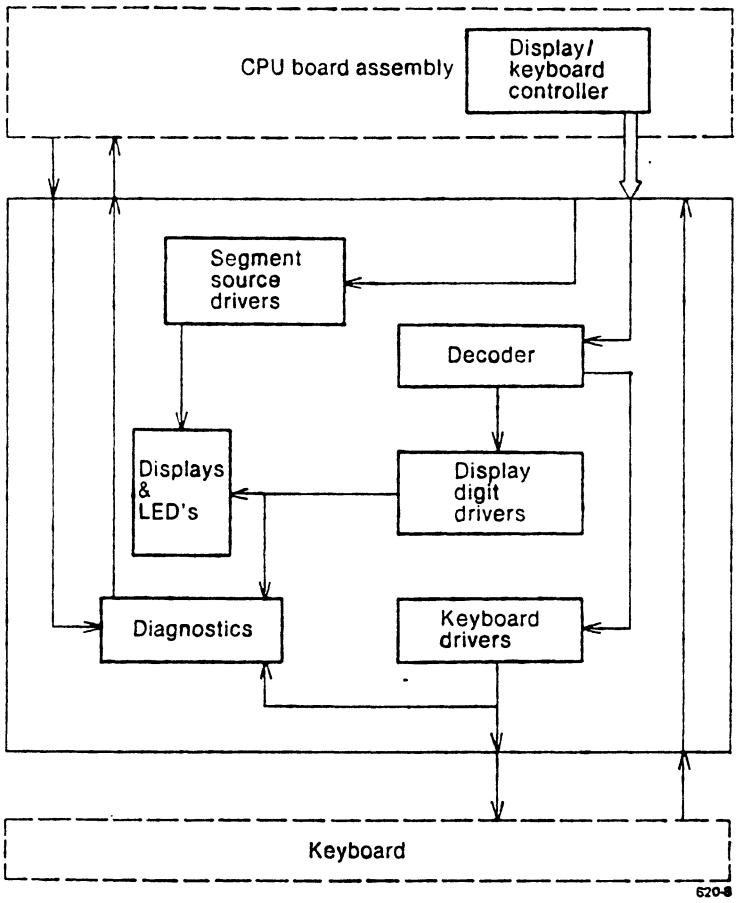

Figure 8 — Keyboard and display board functional block diagram

Keyboard and Display Assembly

The Keyboard and Display Assembly (Figure 8) provide the interface between the Reporter and the operator. The assembly is controlled by a keyboard/display controller located on the CPU board.

The operator uses the keyboard to enter configuration and other data and to control the various operational modes. The controller scans the keyboard for an active key. Once an active key is found, it must be accepted and validated by the controller before the CPU is interrupted.

The operator uses displays to monitor the Reporter's status and input data. Display data is sent from the CPU to the keyboard/display controller located on the CPU board. This controller then controls the status of all displays and LED's.

Digital (I/O) and Relay Terminal Boards

These assemblies (Figure 9) enable the Reporter to control external devices and to be controlled by such devices. For example an output relay can be configured to actuate when a deviation or set point alarm value is exceeded so that an external device connected to the output relay contacts is controlled by the alarm circuit. Digital inputs connected to the remote switching inputs of the Reporter can, through configuration, control various functions by remote control: for example, resetting the alarms, printing messages, and changing the input range.

The main CPU controls all I/O and Relay Terminal Board activity. The CPU sends digital data to the I/O board assembly output latch. The latch, acting through relay drivers configures the six output relays. Digital inputs are fed to isolators on the I/O board which then are read by a latch. This latch saves the digital input data for the CPU. The input and output latches are checked as part of the diagnostic routine.

Transformer T1 supplies two separate ac voltages to the I/O board directly from its secondary windings. The I/O board rectifies and regulates these voltages to provide two regulated dc supplies: one to the output circuitry, and another to the input circuitry.

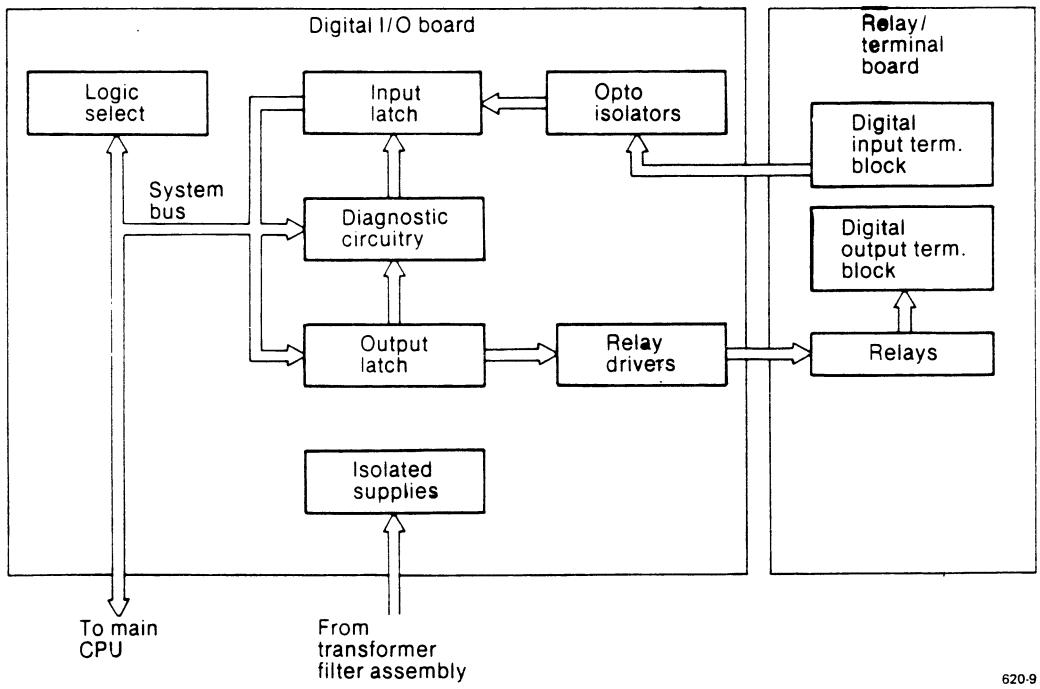

Figure 9 — Digital input/output and relay terminal functional block diagram

Power Supply/Print Control (PS/PC) Board

The Power Supply/Print Control board (Figure 10) supplies to the CPU, I/O, and display board assemblies a regulated +5 Vdc and to the electromechanical devices two unregulated voltages: 31.5 ±4.5 Vdc to the chart motor, scan motor, and color change clutch; and 35.0 ±6 Vdc to the print head and color-change clutch.

An on-board 8041 microcomputer controls the Reporter's electromechanical devices.

Power Supply

The PS/PC board is fed three unregulated dc voltages from the Transformer/Filter assembly. An unregulated dc voltage from transformer T1 is used to supply a 5 Vdc switching regulator which, in turn, puts out a regulated 5.1 ±0.1 Vdc voltage used as the logic supply. The 5 volt supply is fused on the unregulated side by F13 and on the regulated side by F14. Diagnostic LED DS1 monitors the regulated 5.1 ±0.1 Vdc.

The Power Supply section of the board also generates a reset voltage which prevents the +5 volt supply from being applied to the Reporter circuitry until the +5 volt supply voltage is within tolerances. Thus, the reset voltage prevents random or sporadic firings of the print head pins when power to the Reporter is turned on or off. Diagnostic LED DS2 is lit when the +5 volt line is enabled.

Print Control

The main CPU gives instructions to the PS/PC board assembly's microcomputer. This microcomputer, in turn, controls all of the electromechanical printing devices.

Working through voltage drivers, the microcomputer regulates the velocity, acceleration and deceleration of the scan and chart stepper motors by sequentially powering the four phase windings of each motor. The microcomputer also controls the operation of the color change clutch through the voltage drivers.

A data latch drives the printhead drivers which, in turn, activate the nine-wire, dot-matrix printhead. The data latch receives its data input from the CPU; however, the latch's output is enabled by the PS/PC board microcomputer. This "enable" signal synchronizes the scan motor and print head's pin firing.

Diagnostic electronics monitor the voltage supplies used to drive the electromechanical devices and the current through each electromechanical device. The PS/PC microcomputer is sent error detection data which is read by the main CPU.

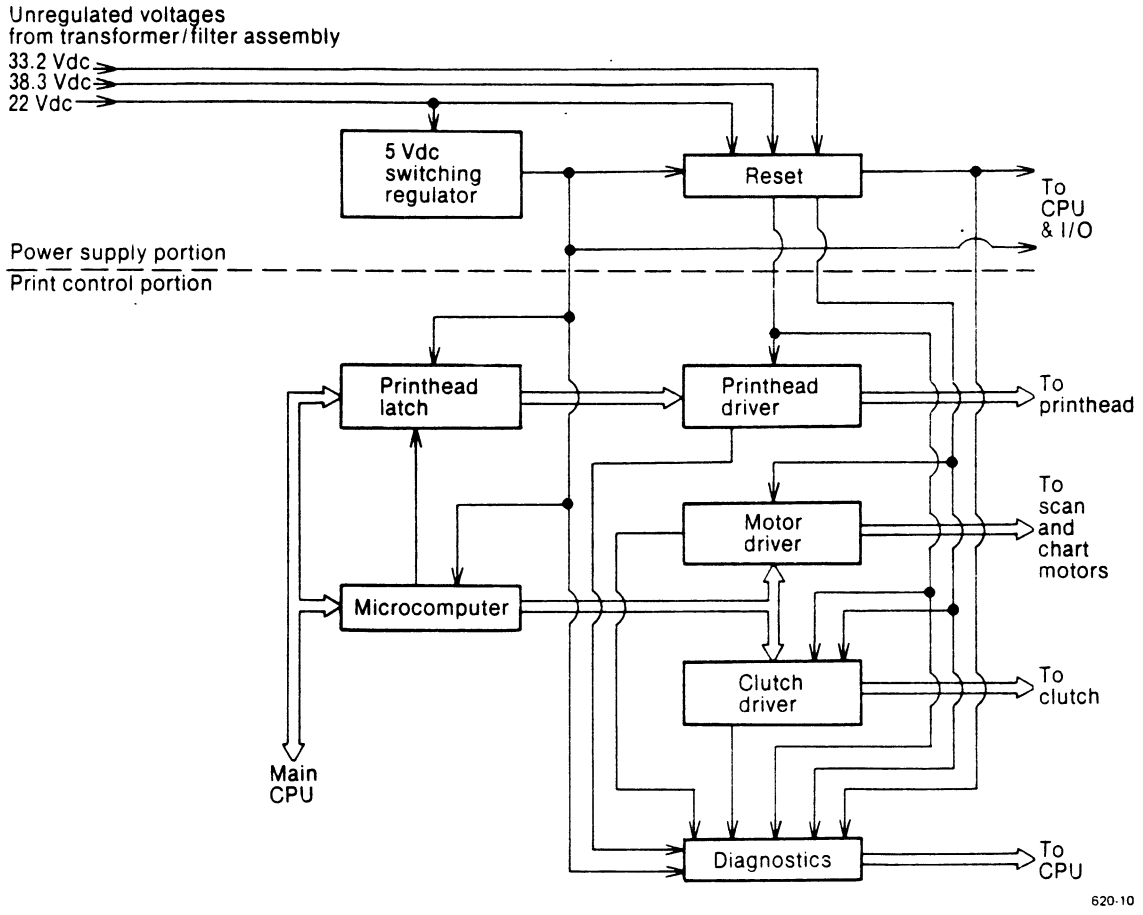

Figure 10 — Power supply/print control board functional block diagram

Operating Principles (cont)

Electromechanical Subsystem

The electromechanical subsystem interfaces to the electronic subsystem through a 8041 microprocessor which works in conjunction with the main CPU to provide computer control of all printing functions.

Color Change Clutch

The color change clutch disengages the matrix printhead from the scan motor. This allows the scan motor to reposition the ink wheel cluster with respect to the matrix printhead.

Chart and Scan Motors

Both the chart and scan motors are stepper motors. The 8041 microprocessor on the PS/PC board has logic control of these motors allowing it to control the motor's velocity, and rate of acceleration and deceleration. The stepper motors rotate when the microprocessor sequentially powers each motor's four field windings. Digital pulses are applied to the chart stepper motor at a constant rate of 1670 pulses per second. At top speed, the scan motor is also fed pulses at a rate of 1670 pulses per second; however, during acceleration and deceleration, the microprocessor varies the rate at which its field windings are sequentially powered in a manner that provides for a gradual increase and decrease in speed. It takes 20 milliseconds for the scan motor to accelerate to or decelerate from top speed. Each digital pulse applied to these motors causes 1.8 degrees of motor rotation.

The motors drive their loads through a series of belts and pulleys. The scan motor moves the nine-wire dot-matrix printhead and ink wheel cluster horizontally in both directions across the chart. The chart motor moves the chart, attached to tractor-sprocket wheels, vertically in both directions.

Print head

A matrix nine-wire print head generates all alphanumeric and graphic characters. The wires are vertically positioned in the printhead and surrounded by a field coil. A wire is fired when 38 volts dc is applied across its coil for 333 microseconds. The electromagnetic field created by energizing this coil causes the pin corresponding to this coil to fire. The pin returns into the print head in 867 microseconds.

One-color instruments use a mandril and pressure-sensitive paper to make images on the paper. When a pin from the printhead fires, it forces the pressure-sensitive paper up against the mandril to produce a printed character.

Six-color instruments use a color wheel and plain paper. When the pin from the printhead fires, it forces the chart paper against the color wheel to produce a printed character.

Switches and Sensors

The reference sensor is an optical device that includes an LED for a light source and a sensor that provides a zero percent chart reference signal to the PS/PC microprocessor. Each time the print head returns to the left side of the Reporter, a metal "flag" which is attached to the print head carriage, breaks the light path between the LED light source and the sensor. The change in the sensor voltage caused by the no light condition is sensed by the uP and interpreted as the zero percent chart reference signal. With the zero reference established, the uP knows when to reverse the scan motor's direction, and keeps track of the scan motor's (and therefore the printhead's) position by counting the pulses it applies to the scan motor.

The overrun switch is a MICROSWITCH which prevents the print head from running into either side plate if for some reason the microprocessor does not signal the scan motor to reverse directions. The drive belt to which the printhead is attached has two "belt bumps" which are spaced so that a print head excursion too far in either direction will cause one or the other belt bumps to activate the overrun switch. This action opens the scan motor circuit and causes the printhead to reset.

The paper out switch located on the right tractor stops the chart motor when the chart roll nears its end. Each chart paper roll has a rectangular cut-out located near the end of the paper roll. When the cut-out travels over the switch, the switch closes which causes the chart motor to stop and paper-out LED to go on.

Honeywell

DPR 1500
Digital Process Reporter

Installation

TABLE OF CONTENTS

	Page	Drawing
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External Wiring Diagrams		
AC Supply Line		30752256-000
Signal Input Wiring		30752729-000
Digital Inputs-Relay Outputs		30752424-000

Introduction

Information on mounting the Reporter and connecting both wiring and arc suppressors appears on drawings included with this section.

Your particular configuration of the Reporter determines which terminals to use for wiring. So, before connecting this wiring, complete the information required in the "Preparation" and the "Configuration" sections of the DPR Product Manual. The following procedures allows you to prepare an already mounted Reporter for reshipment.

Securing the Reporter for Reshipment

Material Required

1. Two steel, 8-32 x .75 in. screws and two size 8 split lockwashers
2. Two feet (600 mm) of string or equivalent.

Tools Required

Screwdriver

Procedure

(Figure 1)

1. Remove the chart roll.
2. Remove the print-wheel, and pack in a separate container
3. Use string to tie carriage to the left side plate.
4. Secure the chassis to the case with two steel, 8-32 x .75 in screws and two size 8, split lockwashers

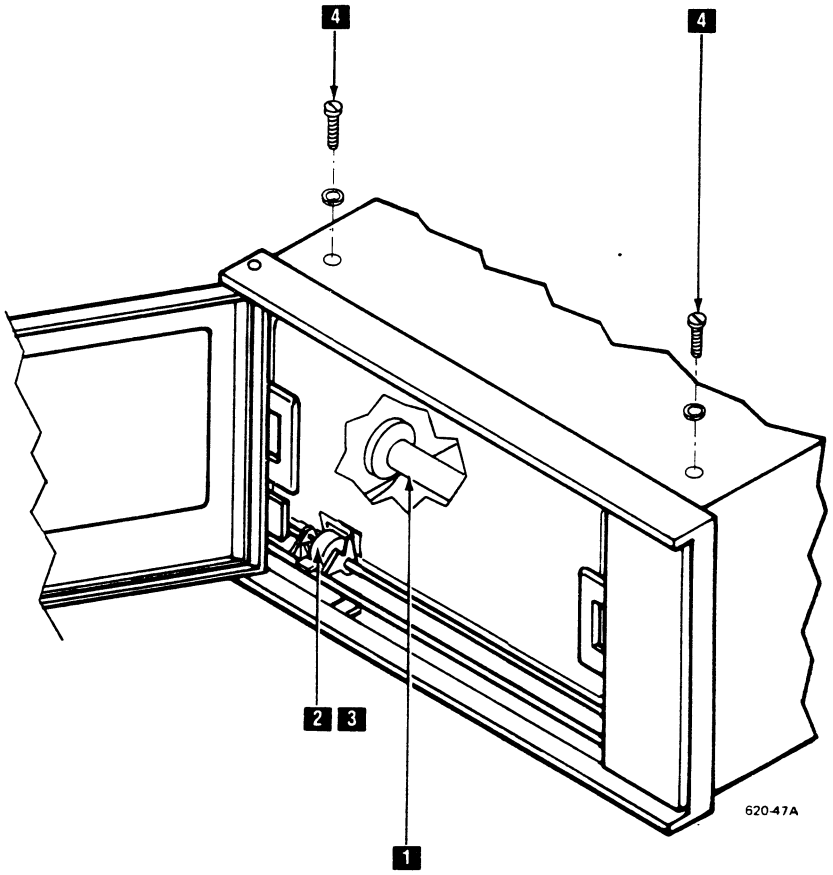

Figure 1 — Securing the Reporter for Reshipment

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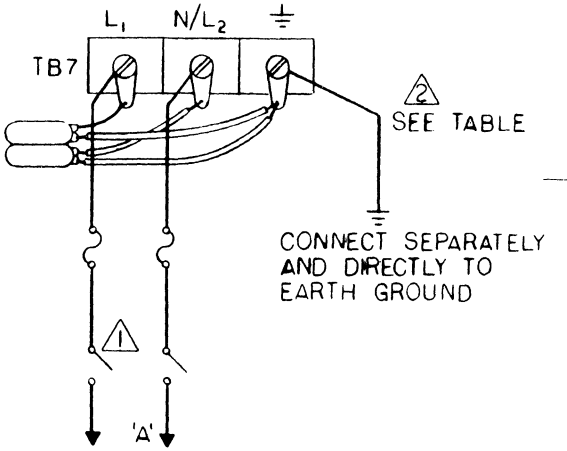
SHEET	1	2	3	4	5
REV					

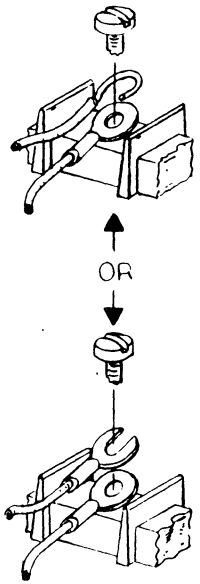
PRE REL	2	6				
REV	REVISION & DATE					APPD
1	RELEASED 4-11-83					

⚠2 LINE SUPRESSOR IDENTIFICATION

MODEL SPECIFICATION TABLE II FIRST DIGIT	MOV RATING VOLTAGE	INSULATOR COLOR	PART NO.
1	120 VAC LINE	BLUE	30751510-001
2	240 VAC LINE	RED	30751510-002



TERMINAL IDENTIFICATION DATA



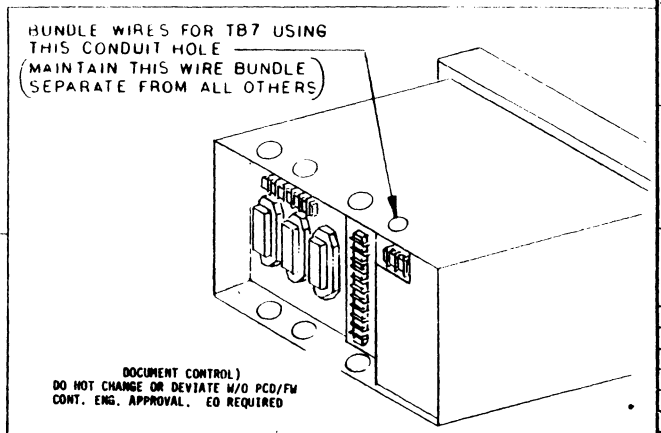
1 - LOOSEN SCREW, DO NOT REMOVE.

2 - REMOVE 25.4±6.35/1.00±.25 INSULATION FROM 1.024/.0403 Ø (18 GAGE) WIRES FOR L1 AND L2. 1.29/.0506 Ø (16 GAGE) WIRES MIN. FOR ⏚.

3 - FORM HALF LOOP OR CRIMP ON TERMINALS TO FIT A NO. 6 SCREW.

4 - TIGHTEN SCREW

WIRE CONNECTION PROCEDURE


BUNDLE WIRES FOR TB7 USING THIS CONDUIT HOLE
(MAINTAIN THIS WIRE BUNDLE SEPARATE FROM ALL OTHERS)
DOCUMENT CONTROL)
DO NOT CHANGE OR DEVIATE W/O PCD/FW
CONT. ENG. APPROVAL. EO REQUIRED

WIRE BUNDLING PROCEDURE

⚠2 LINE SUPPRESSOR ASSEMBLY IS FACTORY INSTALLED IN ACCORDANCE WITH THE LINE VOLTAGE REPRESENTED BY THE FIRST DIGIT OF MODEL SPECIFICATION TABLE II SELECTION. DO NOT REMOVE.

⚠1 VOLTAGE ON CURRENT CARRYING AC LINES MUST MATCH NAMEPLATE DATA. IF THERE IS NO CURRENT CARRYING GROUNDED NEUTRAL, FUSE BOTH LEADS. IF ONE AC CONDUCTOR IS A CURRENT CARRYING GROUNDED NEUTRAL, CONNECT TO LEAD "A" AND FUSE HOT LEAD ONLY. EXTERNAL FUSES, SWITCHES OR CIRCUIT BREAKERS MUST BE SIZED TWO TO FOUR TIMES LARGER THAN THE INSTRUMENT FUSE. ALL FUSES, SWITCHES OR CIRCUIT BREAKERS TO BE RATED TO 250 VAC.

NOTES:

PROJECTION	DRAWN	AJC	5-27-82
LINEAR MEASURE: mm / IN	CHECKED		6-8-82
MATERIAL	DEV ENGR		6-14-83
	MFG ENGR		6/14/83
	QA ENGR		6/14/83
	MAT ENGR		
FINISH	TOLERANCE UNLESS NOTED		
	ANGULAR DIMENSION		

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DO NOT SCALE DWG

Honeywell

EXTERNAL WIRING DIAGRAM
AC SUPPLY LINE
DPR 1500 CL.DR

C/A2 30752256-000

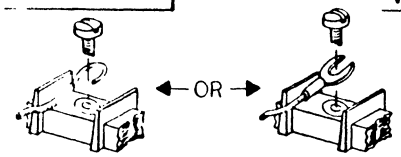
SCALE NONE | USED ON DPR 1500 | SHT 1 OF 1

30752256-000

KM SK BH FW

PLATE | 7693 | PK | 94

WIRE CONNECTION PROCEDURE



1 - LOOSEN SCREW, DO NOT REMOVE.

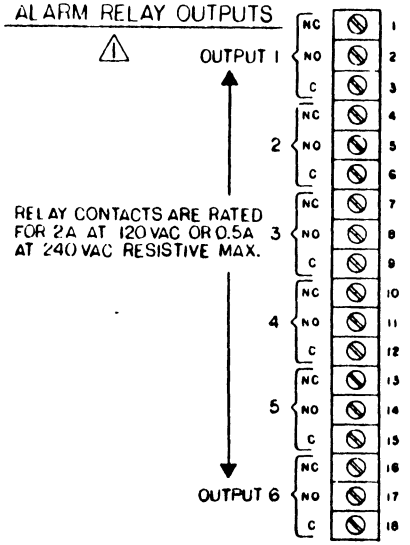
2 - REMOVE 25,4 ± 6,35/1.00 ± .25 INSULATION FROM 1,024/.0403 ϕ (18 GAGE) WIRES, MINIMUM.

3 - FORM HALF LOOP OR CRIMP ON TERMINALS TO FIT A NO. 6 SCREW.

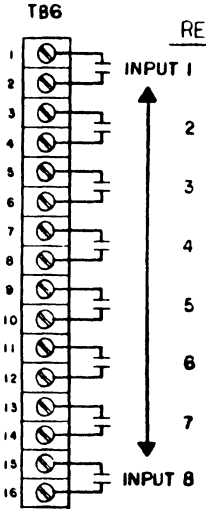
4 - TIGHTEN SCREW.

ALARM RELAY OUTPUTS

⚠

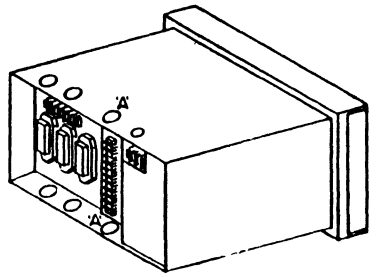


RELAY CONTACTS ARE RATED FOR 2A AT 120 VAC OR 0.5A AT 240 VAC RESISTIVE MAX.



REMOTE TASK SELECTION INPUTS

CONTACTS CONNECTED TO INPUT TERMINALS MUST BE SUITABLE FOR 12MA AT 24 VDC. A CONTACT CLOSURE MUST BE HELD FOR AT LEAST 2 SECONDS MIN. FOR AN INPUT TO BE RECOGNIZED. ALL INPUTS ARE BASED ON CONTINUOUS CONTACT CLOSURE FOR THE APPROPRIATE "ON" STATE..



PASS WIRES FOR TB5 AND TB6 THROUGH EITHER OR BOTH CONDUIT HOLES MARKED 'A'. MAINTAIN THE WIRES CONNECTED TO TB5 AND TB6 SEPARATE FROM A.C. POWER WIRES AND ALSO FROM ONE ANOTHER. FOR WIRES CONNECTED TO TB5 AND TB6 THAT ARE LONGER THEN 1.53 METERS/5 FEET, USE SHIELDED TWISTED PAIRS. CONNECT SHIELD TO TB7 ⏚ (SEE WIRING DIAGRAM 30752256-000).

TERMINAL IDENTIFICATION DATA

⚠ INSTALL MOV'S ACROSS ALL DEVICES CONNECTED TO TB5. THE PREFERRED PLACEMENT IS AT THE SOURCE, BUT ALTERNATIVELY THEY MAY BE MOUNTED AT TB5. THE FOLLOWING TABLE IDENTIFIES THE PROPER MOV FOR EACH OPERATING VOLTAGE:

OPERATING VOLTAGE	MOV		HONEYWELL KIT (12 MOVS WITH INSTRUCTIONS)
	HONEYWELL PART	C.E. PART	
100 OR 120 VAC	30732481-001	V130LA10A	30753491-001
200, 220, OR 240 VAC	30732481-002	V275LA15A	30753491-002

NOTES:-

(DOCUMENT CONTROL)
DO NOT CHANGE OR DEVIATE W/O PCR/PU CONT. ENG. APPROVAL. DO REQUIRED.

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PROJECTION | LINEAR MEASURE: mm in | MATERIAL | FINISH | TOLERANCE UNLESS NOTED | ANGULAR DIMENSION

DRAWN JM 12 82 | CHECKED | DEV ENGR | MFG ENGR | QA ENGR | MAT ENGR

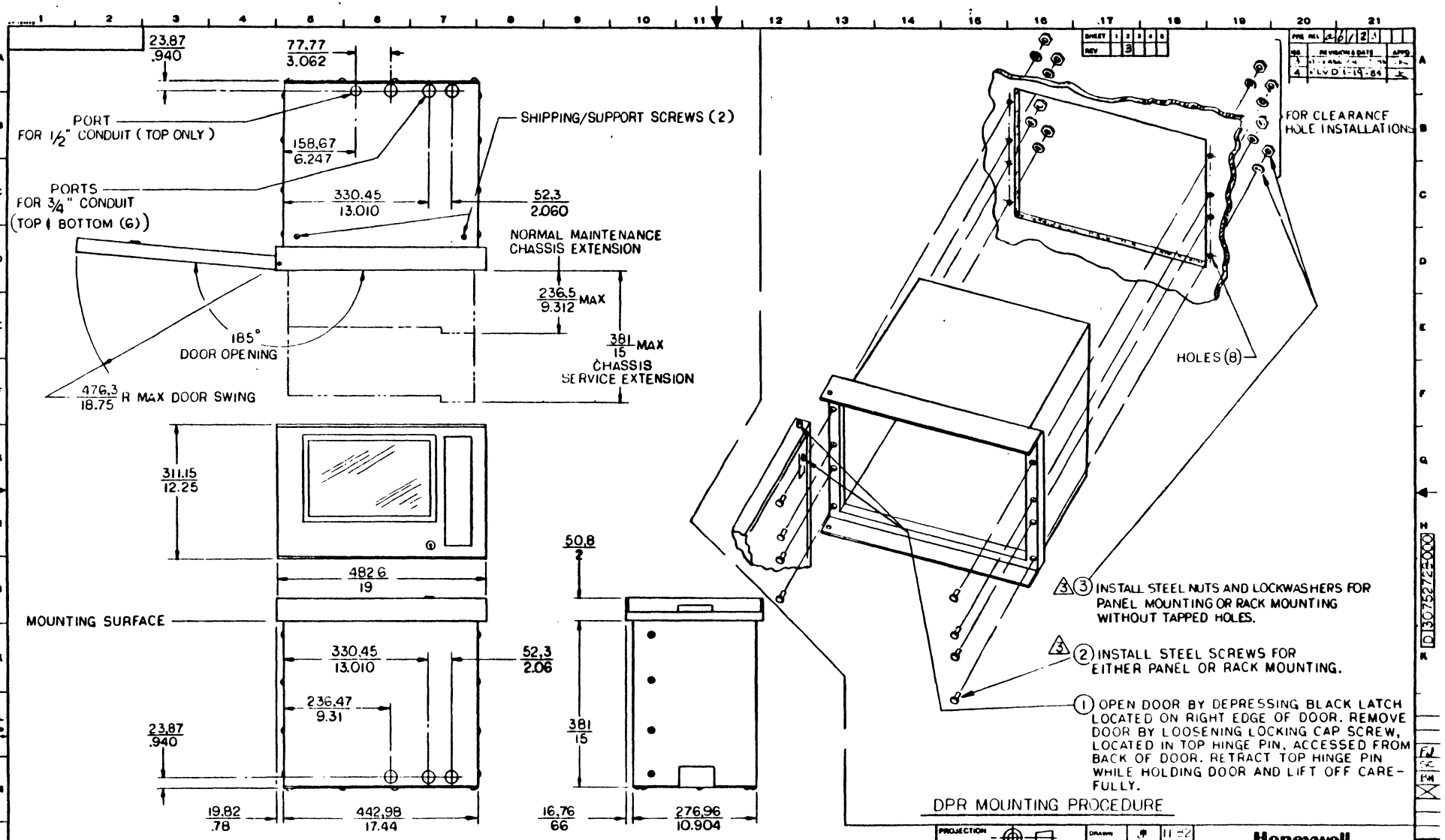
Honeywell

EXTERNAL WIRING DIAGRAM
DIGITAL INPUTS/RELAY OUTPUTS
DPR 1500 CL.DR

A1 30752424-000

[D]30752424-000

REV



DPR MOUNTING PROCEDURE

4 DIMENSIONS SHOWN ARE FOR REFERENCE ONLY.
3 MOUNTING HARDWARE SUPPLIED WITH INSTRUMENT IN KIT 30753488-001.
2-MIN RECOMMENDED CENTERLINE DISTANCE BETWEEN TWO INSTRUMENTS MOUNTED TOP TO BOTTOM = 508/20.
1-MIN RECOMMENDED CENTERLINE DISTANCE BETWEEN TWO INSTRUMENTS MOUNTED SIDE BY SIDE = 533.4/21.

NOTES:

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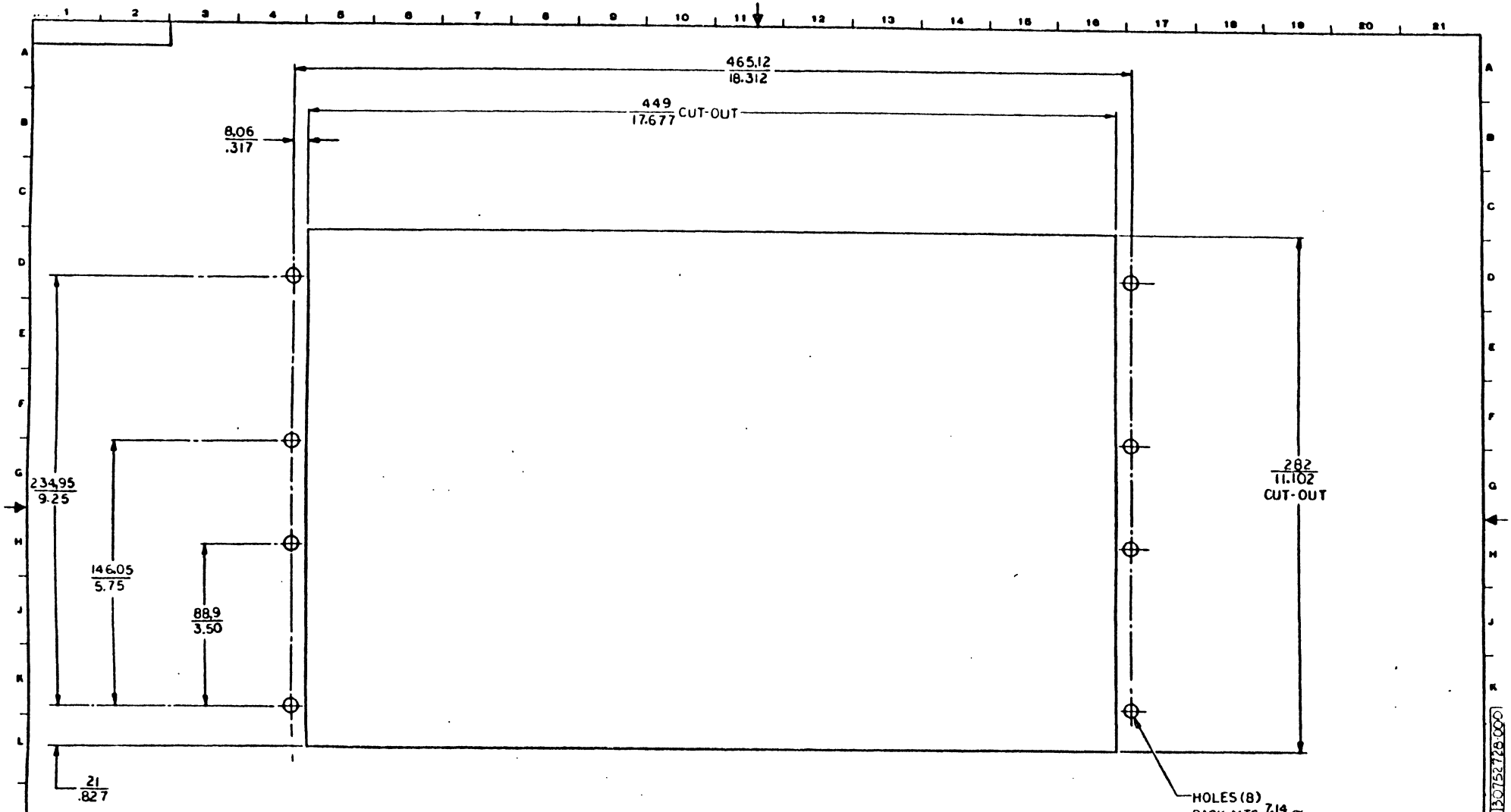
PROJECTION
LINEAR MEASURE:
MATERIAL
FINISH
TOLERANCE UNLESS NOTED

Honeywell

MOUNTING DIMENSIONS
INSTRUMENT
DPR-1500

D/A1 30752728-000



2 MINIMUM RECOMMENDED PANEL THICKNESS IS 3.18/.125. OTHER THICKNESS MAY BE USED PROVIDING ADEQUATE SUPPORT IS PROVIDED TO HOLD THE FULL WEIGHT OF THE INSTRUMENT (38.56 Kg/85 Lbs)

1 CUT-OUT TOLERANCES ARE ± 0.8/.031. ALL OTHER DIMENSIONS ARE REFERENCE ONLY.

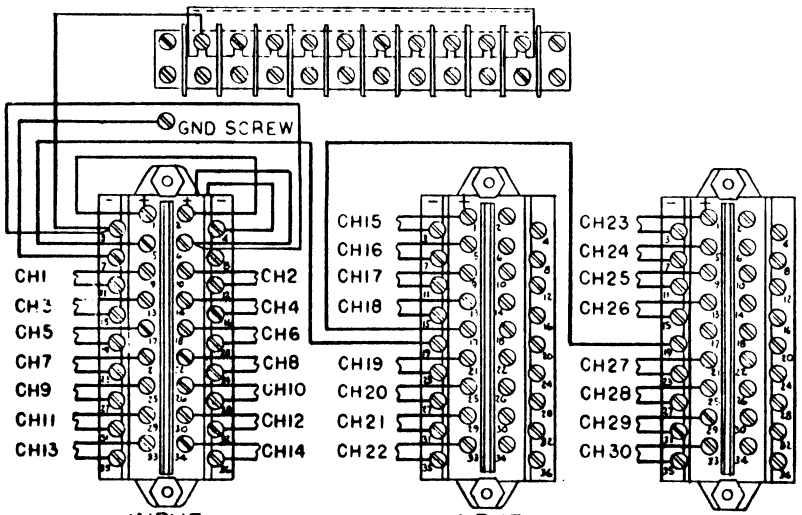
NOTES: (THIS SHEET ONLY)

MOUNTING DIMENSIONS
TEMPLATE
DPR-1500

Honeywell | D/A1 | 30752728-000

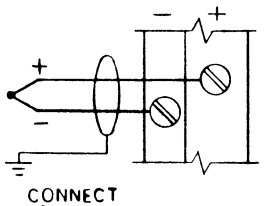
D|30752728-000

RTD COMMONING TB4 (OPTIONAL)

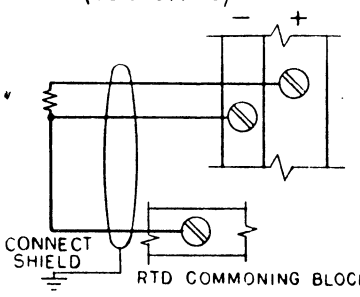


TERMINAL IDENTIFICATION DATA (1)

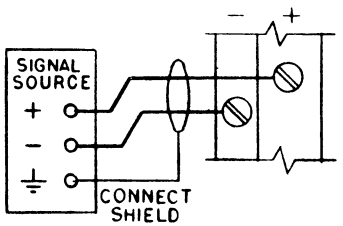
THERMOCOUPLE INPUT B,E,J,K,N,T,R,S AND W



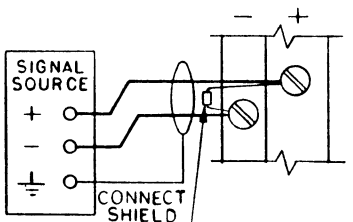
THREE WIRE RESISTANCE TEMPERATURE DETECTOR INPUT (100 OHMS)



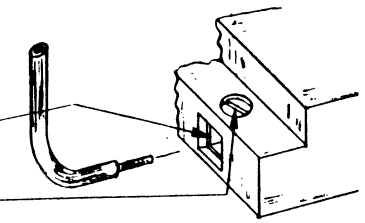
MILLIVOLTS & VOLTS INPUT



CURRENT INPUT



DROPPING RESIST R 250 OHMS ±.1%
25 PPM, 1/4 W
(SUPPLIED IN KIT NO. 30753449-001)



3-ADD 90° BEND 12,7 ± 3,2/.500±.125 FROM END OF WIRE

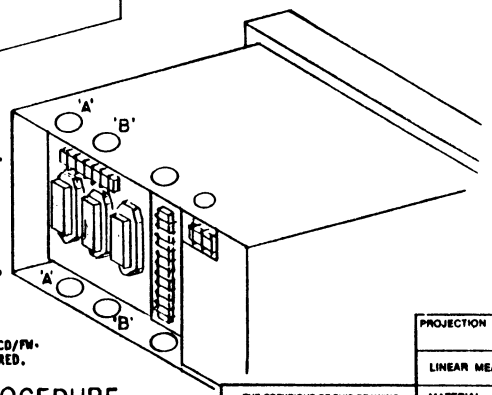
2-REMOVE 6,35 ± 3,2/.250 ± .125 INSULATION

1-USE INSULATED STRANDED OR SOLID WIRE 0.254/.0100 ϕ (30 GA.) TO 2,053/.0808 ϕ (12 GA.)

WIRE INSERTION PROCEDURE

BUNDLE WIRES FOR TB1 USING EITHER OR BOTH CONDUIT HOLES MARKED 'A'

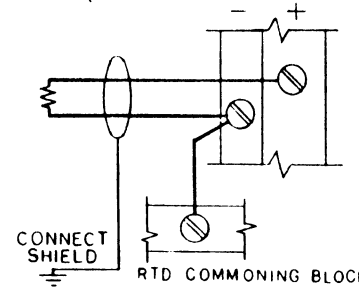
BUNDLE WIRES FOR TB2 AND TB3 USING EITHER OR BOTH CONDUIT HOLES MARKED 'B'



DOCUMENT CONTROL)
DO NOT CHANGE OR DEVIATE W/O PCD/FW-CONT. ENG. APPROVAL. EO REQUIRED.

WIRE BUNDLING PROCEDURE

TWO WIRE RESISTANCE TEMPERATURE DETECTOR INPUT (100 OHMS)



2. MAINTAIN SIGNAL INPUT WIRING SEPARATE FROM A.C. SUPPLY LINE, DIGITAL INPUT LINES, AND RELAY OUTPUT LINES

(1) TERMINAL BLOCK WIRING (TB1 TO TB4) WITH THE EXCEPTION OF CH1 THROUGH CH30, IS PERFORMED AT HONEYWELL

NOTES -

SHEET	1	2	3	4	5
REV					

PRE REL	R	6	4	1	2		

ISS	REVISION & DATE	APPD
2	RELEASED 4-11-83	
3	REV'D 8-23-83	

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PROJECTION	DRAWN	11-82
LINEAR MEASURE: MM / IN	CHECKED	
MATERIAL	DEV ENGR	
	MFG ENGR	
FINISH	QA ENGR	
	MAT ENGR	
TOLERANCE UNLESS NOTED	ANGULAR DIMENSION	

Honeywell

EXTERNAL WIRING DIAGRAM
SIGNAL INPUT WIRING
DPR1500 CL.DR

C/A2 30752729-000

SCALE NONE | USED ON DPR1500 | SHT 1 OF 1

PLATE | 7693 | PK | 82

C 30752729-000

Honeywell

DPR 1500
Digital Process Reporter

Preparation

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Introduction

To maintain, service, and configure the Reporter, there are certain procedures with which you should become familiar or which you may want to know. These are explained in the following instructions and illustrations.

Opening the Door and Withdrawing the Chassis for Maintenance

Tools Required

None

Procedure

(Figure 1)

1. Unlock if required; then press the latch on the right edge, and pull the door open.
2. Press the latch on the right side of the bottom of the case; then pull the chassis until the latches on the rails catch.

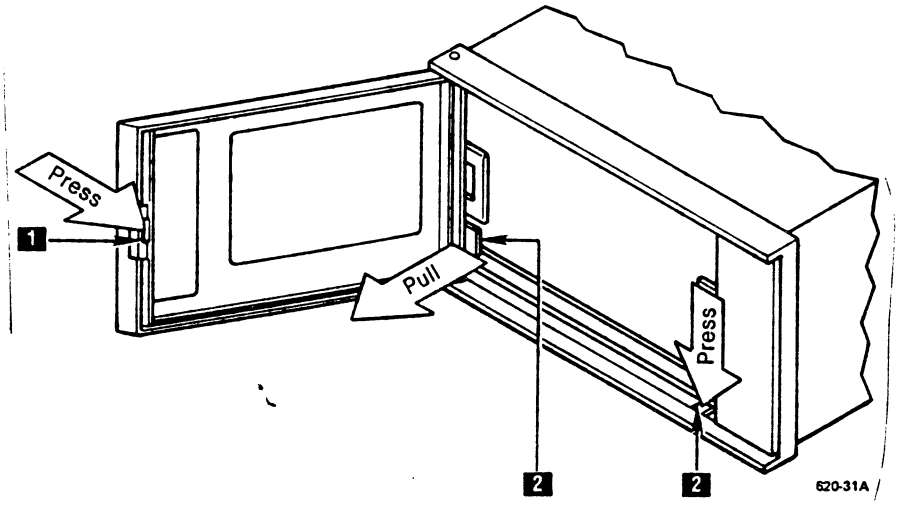

Figure 1—Opening the door and withdrawing the case for maintenance

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Withdrawing the Chassis for Service

Tools Required
Screwdriver

WARNING: Remove power from the Reporter.

Procedure
(Figure 2)

1. Open the door, and withdraw the chassis to the maintenance position.
2. Remove the stop-screws from the rails.
3. Press the latches on the rails; then pull the chassis until the latches catch.

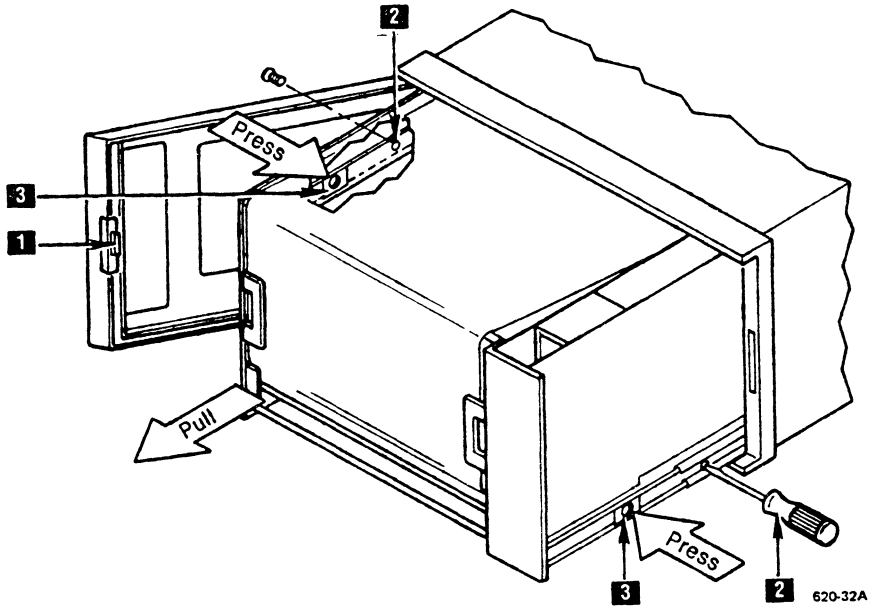

Figure 2 — Withdrawing the chassis to the service position

Returning the Chassis to the Case After Either Maintenance or Service

Tools Required
Screwdriver

Procedure
(Figure 3)

NOTE: Steps 1 and 2 are only applicable if the chassis is withdrawn to the service position.

1. Press the latches on the rails, and push the chassis until the latches on the rails catch.
2. Reinstall the stop-screws.
3. Press the latches on the rails, and push the chassis until the latch on the case catches.

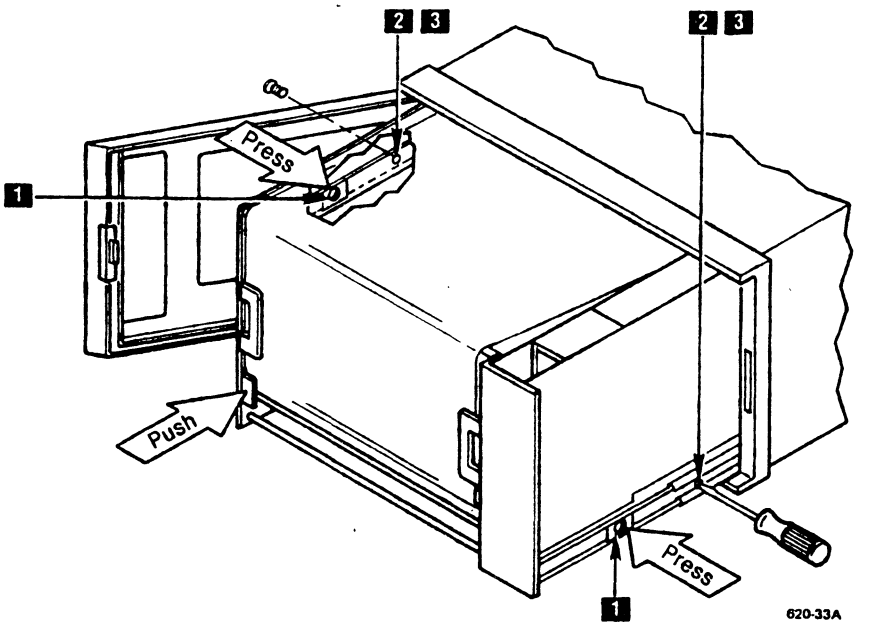

Figure 3 — Returning the chassis to the case

Installing a Roll of Chart Paper

Tools Required
None

Materials Required
- A roll of chart paper: either Part Number 30752499-002 for one-color printing, or Part Number 30752499-001 for six-color printing.
- A chart roll tube (One tube is packed with the Reporter. Additional tubes can be obtained from rolls of chart paper for either the Reporter or Honeywell Models 15, 16 and 112 recorders.)
- Approximately one inch of adhesive-backed tape.

Procedure
(Figure 4)

1 If the Reporter is powered, press [LOAD] to light the indicator on the key and put the Reporter in the load mode; then open the door, and withdraw the chassis to the maintenance position.

2 To see the paper supply roll, swing open the tractor covers, and pull down the platen.

3 Install the chart roll tube in the re-roll hubs by using the tube to push the left hub; then align the slot in the right end of the tube with the key in the right hub. Close the chart platen.

4 With the paper unrolling from under the roll, install a new roll of chart paper on the supply hubs. Use the roll to push the left hub; then align the slot in the right end with the key on the right hub. Tear or fold the paper to give the end a point.

5 Pull enought paper from the roll to reach the re-roll tube; feed the pointed end through the guides, and over the platen.

6 Use the tape to attach the point of the paper to the center of the tube.

7 Align the holes in the sides of the paper with the pins on the tractors; then close the tractor covers.

8 Press [CHRT ADV] then [▲] to take up the slack in the paper; then press [LOAD] to stop the chart drive, turn off the light on the key and take the Reporter out of the load mode.

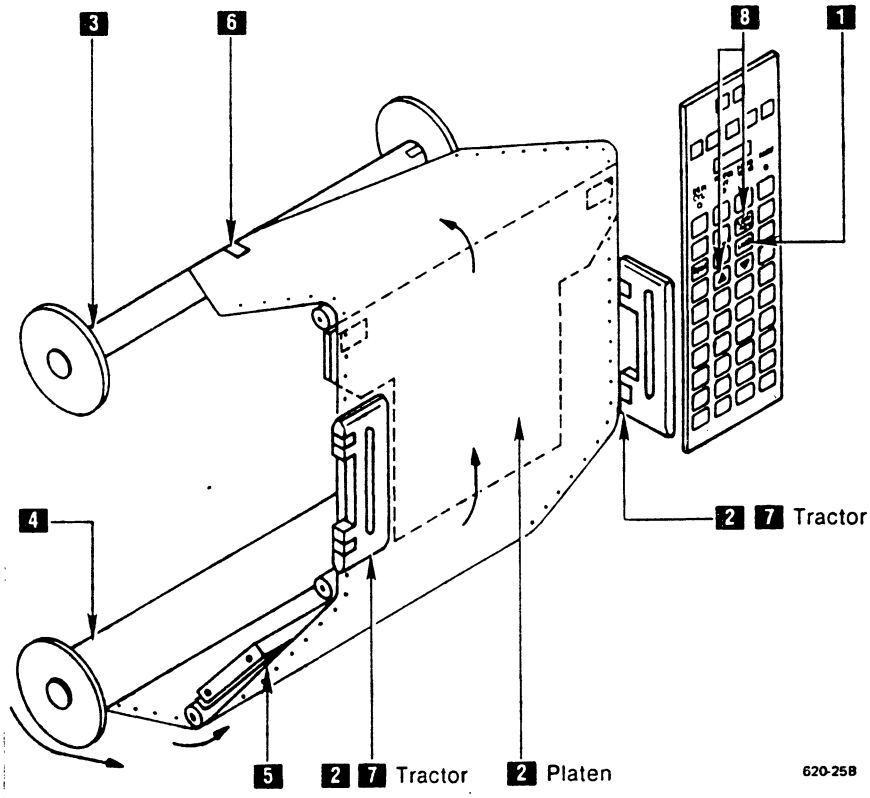

Figure 4 — Installing a roll of chart paper

Installing the Printwheel

Materials Required

One-color printing: Part Number 30752505-001
Six-color printing: Part Number 30752407-001

Tools Required

None

Procedure

(Figure 5)

1 With the Reporter powered, press

LOAD

to light the indicator on the key and thus put the Reporter in the load mode.

2 Hold the printwheel by the shaft, with the gear teeth to the left; then place the left end of the shaft in the slot on the left sideplate of the carriage.

3 Swing the right end of the shaft inward, at the same time pushing the spring-clip to the right. Align the shaft so that the left end is in the hole in the left sideplate and the right end is in the hole in the spring-clip. The gear on the printwheel will be engaged with the gear on the carriage. If it is not, start again at step 2.

4 Press LOAD to turn off the indicator on the key and take the Reporter out of the load mode.

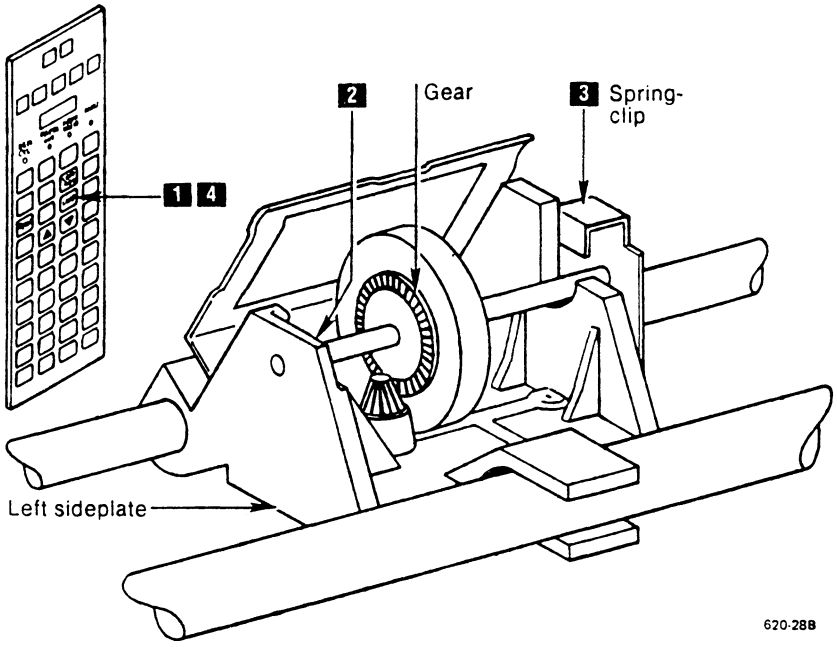

Figure 5 — Installing the printwheel

Assigning Channels to Accept Signals from Resistance Temperature Detectors (RTD)

Materials Required

A connector, Part Number 30731561-001 for each channel to be assigned.

NOTE: A package (Part Number 30753448-001) with thirty-two connectors is furnished with the Reporter if RTD input type can be accepted.

Tools Required

Screwdriver

WARNING: Remove power from the Reporter

Procedure

(Figure 6)

1. Open the door, and withdraw the chassis to the service position.
2. Remove the analog/digital p.c. board assembly by loosening the screw and rotating the retainer out of the way, removing the cables from the edge of the board, and then pulling the board out of the case.
3. Choose the channel numbers you want to accept the RTD input types, and, using Table 1 as a guide, removed and add connectors at the position designated for each chosen channel number
4. If you chose a channel number from the group 15-30, remove the multiplexer p.c. board assembly by removing the retainers at the top and bottom of the case.
5. Using Table 2 as a guide, remove and add connectors at the positions designated on each chosen channel number.
6. Return the p.c. board assemblies to their correct positions, reinstall the retainers and cable assemblies, return the chassis to the case, and close the door.

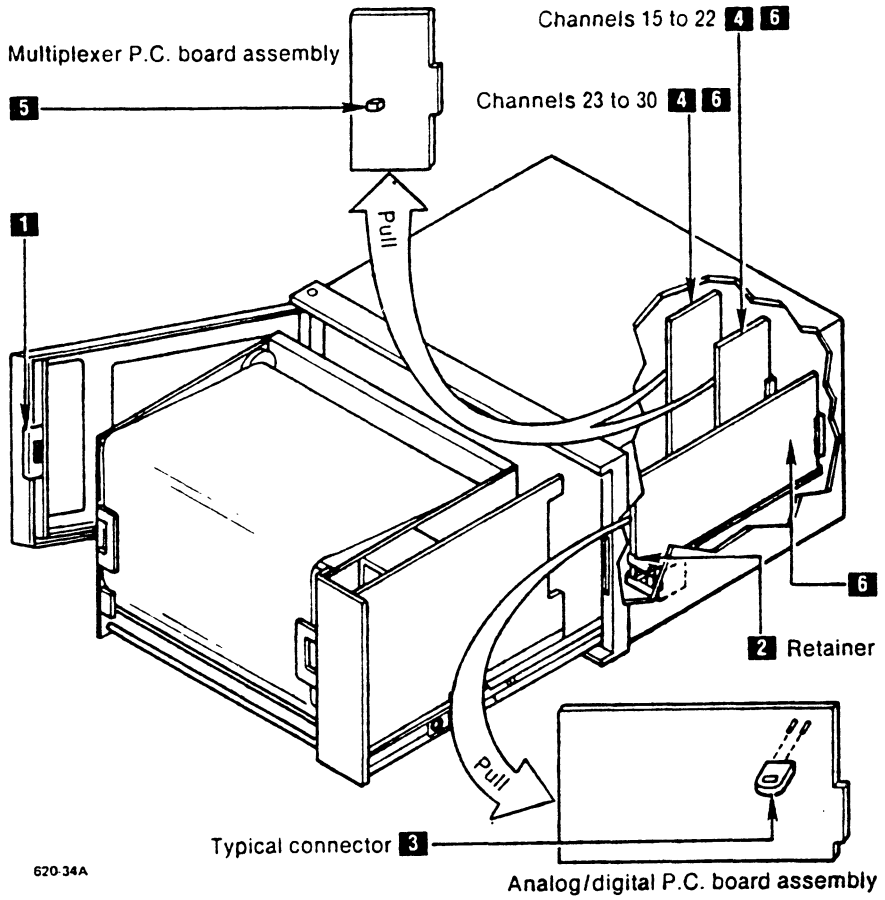

Figure 6 — Assigning channels to accept signals from resistance temperature detectors

TABLE 1 - Positions for the RTD Connectors on the A/D P.C. Board Assembly

Channel number	Position from which connector is removed	Positions to which connectors are added
1	W35	W5 & W6
2	W44	W23 & W24
3	W36	W7 & W8
4	W46	W27 & W28
5	W47	W29 & W30
6	W37	W9 & W10
7	W48	W31 & W32
8	W38	W11 & W12
9	W40	W15 & W16
10	W39	W13 & W14
11	W49	W33 & W34
12	W43	W21 & W22
13	W42	W19 & W20
14	W41	W17 & W18

TABLE 2 -Position for the RTD Connectors on the Multiplexer P.C. Board Assembly

Channel number	Position from which connector is removed	Positions to which connectors are added
15	W19	W1 & W2
16	W20	W3 & W4
17	W21	W5 & W6
18	W22	W7 & W8
19	W23	W9 & W10
20	W24	W11 & W12
21	W25	W13 & W14
22	W26	W15 & W16
23	W19	W1 & W2
24	W20	W3 & W4
25	W21	W5 & W6
26	W22	W7 & W8
27	W23	W9 & W10
28	W24	W11 & W12
29	W25	W13 & W14
30	W26	W15 & W16

Assigning Channels to Accept Current Input Type

Materials Required

A 250 ohm, 1/4 watt, 0.1% resistor for each channel to be assigned.

NOTE: A kit, Part Number 30753449-001, of thirty resistors can be ordered from the nearest Honeywell branch office.

Tools Required

Screwdriver

Procedure

1 Remove the backplate from the Reporter to expose the terminal blocks.

2 Install a resistor across the plus and minus terminals of each channel assigned to measure current.

3 When configuring the channels, use volts as the input type. This results in an input signal range of 0 to 40 milliamperes.

Adding Input Burnout Protection

NOTE: Adding input burnout protection can cause a 30 microvolt error in the analog signal from which the measured variable value is calculated.

The Reporter is shipped from the factory without input burnout protection. This means that if the input circuit opens, either an incorrect measured variable value or an incorrect mnemonic is shown in the lower display and printed on the chart.

Adding input burnout protection, using the following procedure, will give the indications shown in Table 3.

TABLE 3 - Indications of Input Burnout

Print Format	Lower Display	Chart Record
Trend	OVLD	The channel number printed in the right margin
Tabular	OVLD	OVLD printed instead of the measured variable value

Tools Required

Screwdriver

WARNING: Remove power from the Reporter.

Procedure

1 Use steps 1 and 2 on Page 5 to remove the analog/digital p.c. board assembly.

2 Place the connector at position W2 on both pins.

3 Replace the board assembly, return the chassis to the case, and close the door.

Changing the Operating Frequency

Tools Required

Screwdriver

WARNING: Remove power from the Reporter.

Procedure

1 Use steps 1 and 2 on Page 5 to remove the analog/digital p.c. board assembly.

2 To change from 60 Hz to 50 Hz, move connector from position W4 to position W3.

3 To change from 50 Hz to 60 Hz, move connector from position W3 to position W4.

4 Replace the board assembly, return the chassis to the case, and close the door.

Adding Input Filtering

NOTE: The use of this noise filtering procedure can introduce a plus or minus ten microvolt mismatch between the values of the analog signals from which the measured variable values are calculated.

If the noise on the input signal is not reduced sufficiently by the filtering used when the channel is configured, use the following procedure to include a resistor capacitor network in the input circuit.

Materials Required

One connector, Part number 30731561-001, for each channel to be filtered.

Tools Required

Screwdriver

Procedure

1 For channels 1 to 14, use steps 1 and 2, on page 5, to remove the analog/digital p.c. board assembly; then, using Table 3 as a guide, install a connector at the position designated for the channel number.

For channels 15 to 30, use steps 1 and 4, on page 5, to remove the proper multiplexer p.c. board assembly; then, using Table 4 as a guide, install a connector at the position designated for the channel number.

2 Use step 6 on page 5.

Reducing the Effect of Channel Crosstalk

The amount of crosstalk between adjacent channels is 5 nanovolts per millivolt difference between the input signals carried by the channels. The error caused by the crosstalk is significant only when a channel carrying the signal from either a thermocouple, or millivolt input type is preceeded by an adjacent channel carrying a signal from a Volt input type.

To reduce the effect of the crosstalk, either connect the Volt input types to the highest channel numbers used, or short the channel between the channel carrying the Volt input type and the channel carrying the other input type.

TABLE 3 - Positions for the Input Filter Connectors on the A/D P.C. Board Assembly

Channel Number	Positions to which connectors are added
1	W35
2	W44
3	W36
4	W46
5	W47
6	W37
7	W48
8	W38
9	W40
10	W39
11	W49
12	W43
13	W42
14	W41

TABLE 4 - Positions for the Input Filter Connectors on the Multiplexer P.C. Board Assembly

Channel Number	Positions to which connectors are added
15	W19
16	W20
17	W21
18	W22
19	W23
20	W24
21	W25
22	W26
23	W19
24	W20
25	W21
26	W22
27	W23
28	W24
29	W25
30	W26

DPR 1500
Digital Process Reporter

Configuration

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Configuration Worksheet 43-DR-99-01	

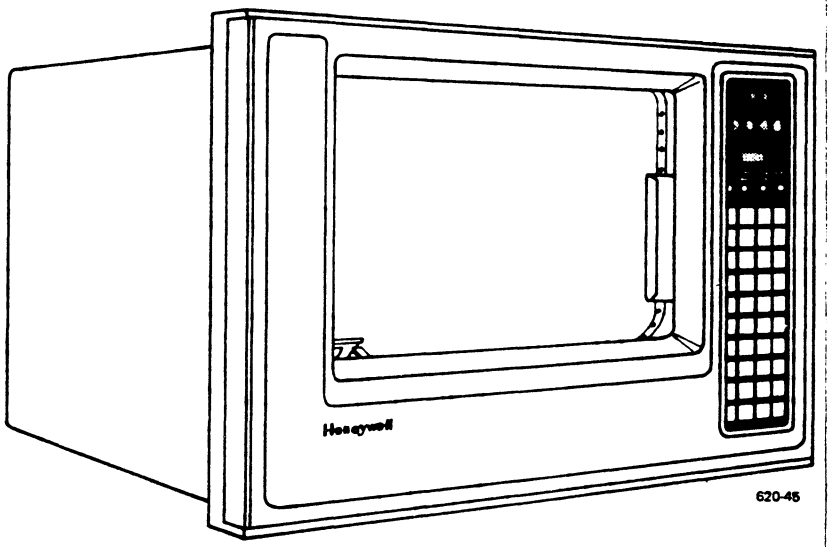

Figure 1—DPR 1500

What Configuration Is

Configuration is the setting-up of the Reporter to match the needs of your application. You set up the Reporter by entering and storing data in the Reporter's memory that identifies the functions you want performed. Data that you can configure includes

- time and date,
- chart ranges and range titles,
- type of input on each channel,
- page headings,
- chart speeds,
- log intervals,
- print groups,
- digital inputs,
- units of measurement for chart speed and temperatures,
- alarm output relay latching.

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What You Should Know Before Storing Configuration Data

Becoming Familiar with the Keyboard

For an explanation of displays and keys used during storage of the configuration data, see Figures 2 and 3 and Tables 1 and 2.

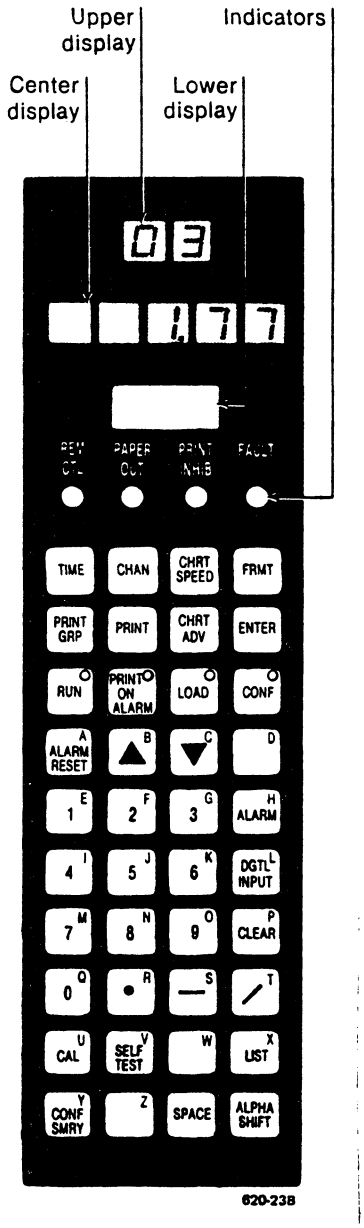


Figure 2 — Displays and Indicator during Configuration.

TABLE 1 — Displays and Indicators used during Configuration

Displays	Functions
Upper Display	Shows the number of the item of data to be entered
Center Display	Shows ALPHA when [ALPHA SHIFT] is pressed.
Lower Display	Shows the name of the first key pressed in a sequence.
	Shows each character initially in the right position. Characters move to the left with each entry of a character. When [CLEAR] is pressed, the last character entered is deleted and the character string moves to the right.
	Shows the error codes.
	When [ENTER] is pressed, BUSY shows momentarily then ENTR.

Indicators	Functions
FAULT	Shows that a failure occurred in the Reporter requiring service.
PRINT INHIB	Shows that a remote contact is closed that stops the printing.
PAPER OUT	Shows that the chart paper roll needs replacement.
REM CTL	Not Used

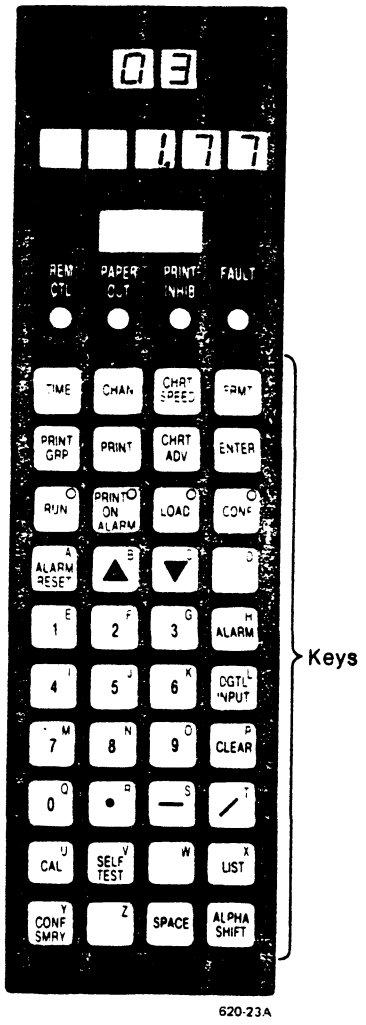


Figure 3—Keys used during Configuration

TABLE 2 - Keys used During Configuration

Keys	Functions
TIME	Allows entry of the first item of time and date data.
CHAN	Allows entry of the first item of channel data.
CHRT SPEED	Allows entry of the first item of chart speed data.
FRMT	Allows entry of the first item of either print format data or the deviation set point data.
PRINT GRP	Allows entry of the first item of print group data.
CHRT ADV	With either ▲ or ▼ advances or rewinds the chart.
ENTER	Stores data and causes data to be printed on the chart.
CONF	With the security code, allows entry to configuration.
ALARM	Allows entry of the first item of alarm data.
DGTL INPUT	Allows entry of the first item of digital input data.
CLEAR	Cancels previous keystroke, except ENTER.
/	Allows entry of the next item of data in a key sequence (cannot be used as a character).
LIST	Causes data to be printed on the chart for review before storing.
ALPHA SHIFT	Allows entry of the letters in the upper right corners of the keys.
CONF SMRY	Causes all stored configuration data to be printed.
–	Gives either a minus sign or a dash or a hyphen.
•	Gives decimal in a number. SPACE Spaces characters.

Becoming Familiar with the Configuration Summary

The configuration summary is a listing of the configuration data currently stored in the Reporter's memory. Also included is a listing of the number of available input channels, print colors, alarm output relays, digital inputs, and units of measurement for the chart speeds. (A typical configuration summary is shown in Appendix A to this section.) You can have the configuration summary printed on the chart by first gaining access to the configuration mode and then pressing [CONF SMRY] then [ENTER].

Before entering new configuration data, examine the configuration summary to see if any of the currently stored data matches your requirements. If any data listed in the configuration summary is usable, you do not have to enter it again.

Entering Items of Data in a Key Sequence

To change the security code, chart speed and temperature units, and alarm relay latching, to enter configuration, and to store configuration data, you use the key sequences in this section. Each key sequence starts with the press of a function key that names the data being entered and allows entry of the first item of data. After the first item of data is entered, and after every item of data entered thereafter, [/] is pressed to signify the entry of an item is complete and the next entry is allowed.

In other words, [/] acts as a divider between items of data.

When the function key is pressed, the number 1 shows in the upper display to signify the first item of data can be entered; then each time [/] is pressed the number in the upper display increases by one to signify the next item of data can be entered.

Alongside the items of data in the key sequences, there is a data number which corresponds to the number in the upper display. This number is to help you keep track of which item of data you are entering.

Before you can press [ENTER] you must have pressed the function key and *all* the [/] listed in the key sequence.

In other words, the data number alongside [ENTER] (which is the sum of the function key plus all the [/]) must be the same as the number in the upper display.

If you do not want to change *all* the items of data in a key sequence, press the first key; then press [/] until the data number corresponding to the item of data you want to change shows in the upper display; enter the new data; then press [/] until the data number alongside [ENTER] shows; then press [ENTER]. For example; in Figure 4, if you only want to change the security code to 1234; press keys as follows: CONF 1234 / / / / / / / / ENTER.

Configuring Channels for Both TREND and TABULAR Print Format

You can store, at the same time, all the configuration data needed to print measured variable and deviation values in TREND and TABULAR print formats, then you can later choose the format either by pressing keys or closing a remote contact.

Advancing, Rewinding and Stopping the Chart

Advancing the Chart

Press [CHRT ADV] [▲] [/] [ENTER]

Rewinding the Chart

Press [CHRT ADV] [▼] [/] [ENTER]

Stopping the Chart

Press any key.

Clearing A Mistake

If you make a mistake before [ENTER], press [CLEAR] until you clear the error, then enter the correct data.

When you press [ENTER], if an error code (Table 3), appears in the lower display, press the function key again and re-enter all the data.

TABLE 3 - Error Codes

Error Code	Meaning
E51	[ALPHA SHIFT] not allowed
	too many characters
	decimal not allowed
	data must be either 0 to 1
	[–] pressed at the wrong time
E52	data exceeds the high limit
E53	data exceeds the low limit

Power Failure During Configuration

Error code E16 will show momentarily in the lower display. No action required unless error code shows continuously. If you have been entering data and haven't pressed [ENTER] to store the data in a key sequence, you have to start again at the first key to the sequence.

Using a Code to Protect Configuration Data

The configuration data is always protected from accidental or unauthorized change by a security code. The security code must be entered to gain entry to configuration.

When your Reporter was configured at the factory, the security code 1500 was used. You can either continue to use this code, or use the procedure in Figure 4 to change the code.

Changing the Chart Speed and Temperature Units

The Reporter was shipped from the factory with chart speed units of inches per hour and temperatures units of degrees Fahrenheit.

Use the procedure in Figure 4 to change these units.

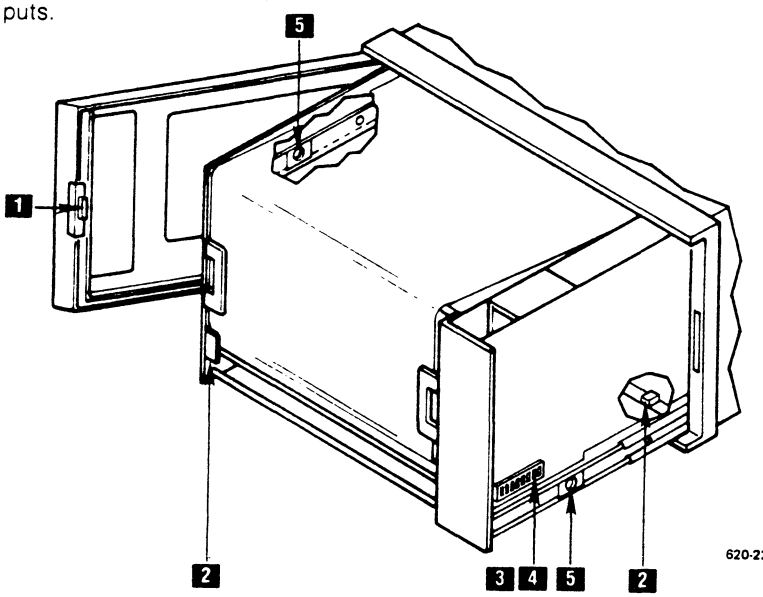
Changing the Alarm Output Relay Latching

The Reporter was shipped from the factory with relay latching. Output relays will be actuated when an alarm condition is present, and remain actuated when the alarm condition is removed. The relays can only be unlatched by pressing [ALARM RESET].

Use the procedure in Figure 4 to change to no relay latching. Output relays will be actuated when an alarm condition is present, and not be actuated when the alarm condition is removed.

NOTE: If you change the chart speed/ temperature units of measurement after you've configured the Reporter, you must

1. Reconfigure all chart speed and temperature-related values to correspond to the new units of measurement. Values that are affected are chart ranges, chart speeds, alarm set points, and deviation set point.
2. Re-enter the input type code (see channel data sequence) for any channels handling thermocouple or RTD inputs.



Procedure

1. Unlock and open the door.
2. Press latch and pull chassis out of the case.
3. Put switch 7 of the DIP switch assembly in the ON position; then use the keystroke sequence shown.

   NOTE: Do not attempt to enter new data when (no entry allowed) is specified. If you think you erred and changed one of these items of data, finish out the key sequence, print a configuration summary and compare the numbers with the INSTRUMENT OPTIONS. If they are different, go to the service section for instructions.
4. Put switch 7 in the OFF position.
5. Press latches, and push chassis into the case.
6. Close and lock the door.

Data Number	Press
	CONF
1. Security Code:	One character minimum Four characters maximum
	/
2.	(no entry allowed)
	/
3.	(no entry allowed)
	/
4.	(no entry allowed)
	/
5.	(no entry allowed)
	/
6.	(no entry allowed)
	/
7. Units of Measurement For Chart Speed and Temperature Code (See Note):	0 for inches per hour and °F 1 for centimeters per hour and °F 2 for inches per hour and °C 3 for centimeters per hour and °C
	/
8. Alarm Output Relay Latching (Code):	0 if all alarm output relays *are not* to be latched. 1 if all alarm output relays *are* to be latched.
	/
	ENTER

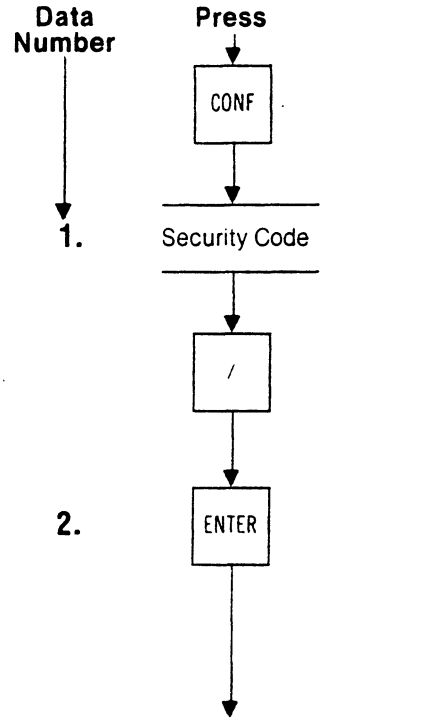
Return to Step 4 of the procedure

Figure 4—Procedure for changing the security code, chart speed and temperature units, and output relay latching

NOTES:
1. Use the security code stored with the key sequence in Figure 4.
2. You can either store the configuration data as you develop it or record the data on the worksheet (Document 43-DR-99-01) at the end of this section and store the data later.
3. While you are in configuration, the Reporter is not scanning the inputs or displaying and printing operating data.

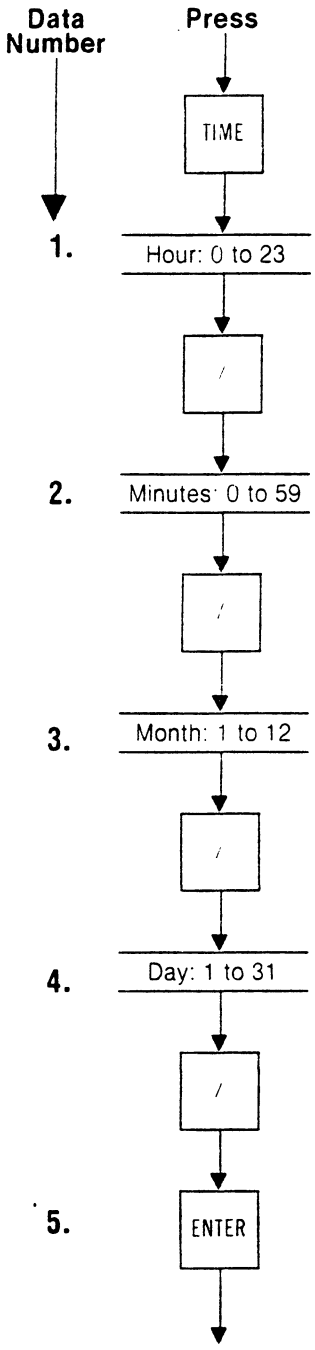
Storing Configuration Data

For entry to configuration use the following key sequence.



NOTES
1. The Reporter does not change the date to 2/29 in a leap year. The date will show as 3/1. On March 1 of a leap year, you have to configure the month to 3 and the day to 1.
2. The clock circuit is battery powered so time and date will not have to be configured after power is turned off

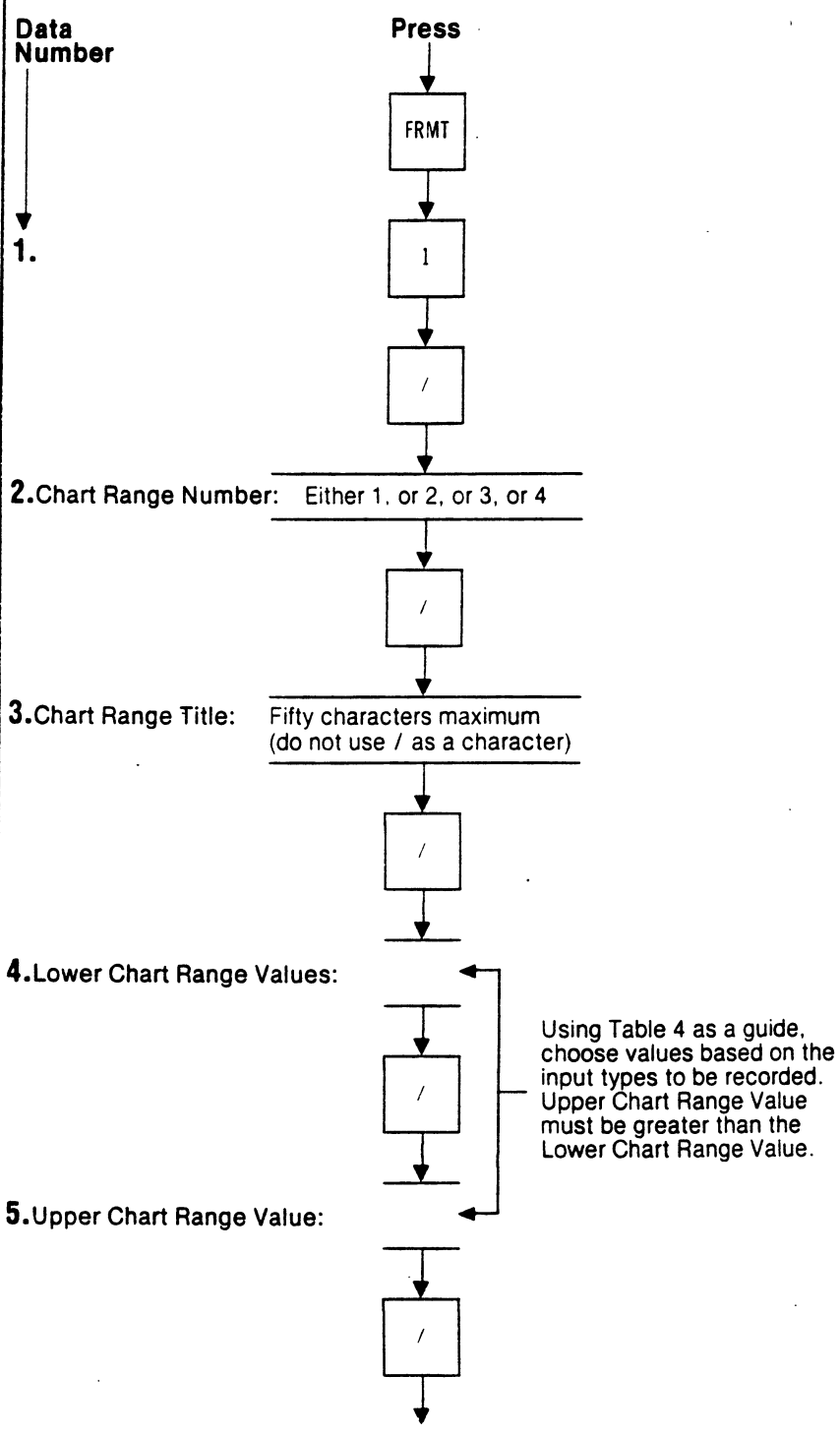
Time and Date (for all print formats)



Information stored and printed on the chart. ENTR shows in the lower display. Either press the next function key to continue the configuration, or, if the configuration is complete, and the Reporter is installed, press RUN

NOTES:
1. You can store up to four chart ranges by repeating the key sequence for each range.
2. For easy interpretation on the chart, choose spans divisible by ten.
3. Spans less than the minimum can be used, but accuracy of the print-out will be poor.
4. Because the ranges are linear, and have no units, you can assign a chart range to any input type when you configure the channel data. You can assign a range to as many channels as you want.
5. The chart ranges and corresponding titles are printed consecutively on the chart, every two inches, regardless of the chart speed.

Chart Ranges (for TREND print format)


Data Number
Press
FRMT
1
1.
/
2. Chart Range Number: Either 1, or 2, or 3, or 4
/
3. Chart Range Title: Fifty characters maximum (do not use / as a character)
/
4. Lower Chart Range Values:
/
Using Table 4 as a guide, choose values based on the input types to be recorded. Upper Chart Range Value must be greater than the Lower Chart Range Value.
5. Upper Chart Range Value:
/

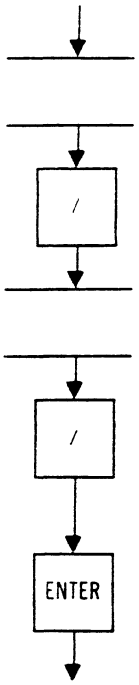
continued on the following page

NOTES:
1. You do not have to configure the remote select chart range values.
2. The remote select chart range allows you to establish a chart range with a different span; then by configuring a digital input to select it, alternately choose the two ranges by closing and opening a remote contact.

Chart Ranges (continued)

6. Remote Select
Lower Chart Range Value:

7. Remote Select
Upper Chart Range Value:



Enter these values only if your Reporter has the digital I/O option. Using Table 4 as a guide, choose values based on input types to be recorded. Upper Chart Range Value must be greater then the Lower Chart Range Value.

8.

Information is stored and printed on the chart. ENTR shows in the lower display. Either press the next function key to continue the configuration, or, if the configuration is complete, and the Reporter is installed, press the RUN key.

TABLE 4 - Chart Range Limits and Minimum Spans

Input Type		Measurable Range Limits Minimum		Measurable Range Limits Maximum		Minimum Span	
Millivolts		0 mV 0 mV 0 mV		20 mV 50 mV 100 mV		3 mV 20 mV 50 mV	
Volts		0V		10V		0.1V	
Milliamperes		0 mA		40 mA		0.4 mA	
		°F	°C	°F	°C	°F	°C
RTD JIS Alpha = 0.003916 IEC Alpha = 0.00385		−300 −300	−184 −184	900 900	482 482	200 200	100 100
Thermocouple	Type E	0	−18	1800	984	200	100
	T	−300	−184	700	370	200	100
	J	0	−18	1600	870	200	100
	K	0	−18	2400	1315	400	200
	Ni-Ni Mo	32	0	2500	1372	400	200
	R	0	−18	3100	1700	1000	500
	S	0	−18	3100	1700	1000	500
	B	105	40	3300	1815	1000	500
	W_5W_{26}	0	−18	4200	2315	1000	500

NOTES:
1. If used, always configure the kind of data for channel 1 as 0 for the measured variable. In other words, Channel 1 can't be a deviation channel. You can configure the remaining channels to record any of the kinds of data in any combination.
2. If you select code 1, you must also configure the deviation setpoint on page 20.
3. Repeat the entry procedure for each channel and groups of channels for which any of the information is different.
4. If your reporter has a six-color print wheel, and you want to use a chart speed faster than 35 inches per hour, see NOTE 4 on page 13 to select the channels you can configure.

TABLE 5 - Input Types with Codes

Input Types		Input Codes
No Input		0
Millivolts (mV)	0 to 20	1
	0 to 50	2
	0 to 100	3
Volts (V)		4
Milliamperes (mA)		4
RTD	IEC (Alpha = 0.00385)	5
	JIS (Alpha = 0.003916)	6
Thermocouple	Type E	10
	T	11
	J	12
	K	13
	(Ni-Ni-Mo) N	14
	R	15
	S	16
	B	17
	W_5W_{26}	18

TABLE 6 - Input Filtering

Code	Amount of Filtering
0	No filtering
1	.25 PPV* + .75 CPV**
2	.5 PPV + .5 CPV
3	.65 PPV + .35 CPV
4	.75 PPV + .25 CPV
5	.85 PPV + .15 CPV

*PPV = Previous Process Value
**CPV = Current Process Value

Channel Data (to all print formats)

Data Number ↓

Press CHAN

1. Channel Number: A single channel number or the first channel number in a sequence of consecutive channel numbers with the same configuration data.

/

2. Channel Number: The same channel number as the above single channel number or the last channel number in the above sequence.

/

3. Kind of Data (code): 0 for the measured variable
1 for the deviation from a fixed set point (See Note 2 this page)
2 for the deviation from channel 1

/

4. Input Type (code): A code selected from Table 5.

/

5. Input Filtering (code): A code selected from Table 6.

/

continued on following page

NOTES:
1. You can assign any chart range number to any channel regardless of the input type.

2. You can assign the same chart range number to more than one channel.

3. The units of measurement (°F or °C) for thermocouples and RTD are automatically displayed, based on what you chose in the key sequence in Figure 4.

4. (a) If you selected an input type code of 5 through 12 (thermocouples or RTDs) in the Channel Data sequence (Step 4), *you* do not have to enter range limits. The Reporter will automatically assign the correct range limits based on the input type code you selected. Refer to the configuration summary or Table 4 if you want to know what those specific values are.

   (b) If you selected an input type code of 1 through 4 (millivolt, volts, or milliamperes) and the measured variable is directly connected to the input to the Reporter (rather than through a transducer), use Table 7 to determine the range limits. For example a measured variable of volts that is directly connected to the Reporter for measurement is in this category.

TABLE 7 - Measurable Range Limits

Input Type	Minimum	Maximum
Millivolts	0 mV	20 mV
	0 mV	50 mV
	0 mV	100 mV
Volts	0V	10V
Milliamperes	0 mA	40 mA

   (c) If you selected an input type code of 1 through 4, but the measured variable is converted (via a transducer) to millivolts, volts, or milliamps for measurement, then *you* must calculate the upper and lower range limits. Examples of these kinds of measured variables include pressure, position, flow, and weight—each of which would require conversion into voltage or current before measurement by the Reporter. To calculate the range limits for measured variables of this type, refer to appendix B at the end of this section.

Channel Data (continued)

6. Chart Range Number: One of the chart ranges configured on Page 8.

/

7. Units of Measurement: Three characters maximum. Do not use / as a character and enter only if input type code is 1, 2, 3, or 4.

/

8. Upper Range Limit: Determine the upper and lower range limits of each active channel. For a given type of input, these numbers represent the minimum and maximum values measurable by the Reporter. The way you determine these values depends on the type of input that you assigned to the channel. There are three ways: Refer to note 4.

/

9. Lower Range Limit: See upper Range Limit

/

10. Tag Number: Six characters maximum
Do not use / as a character

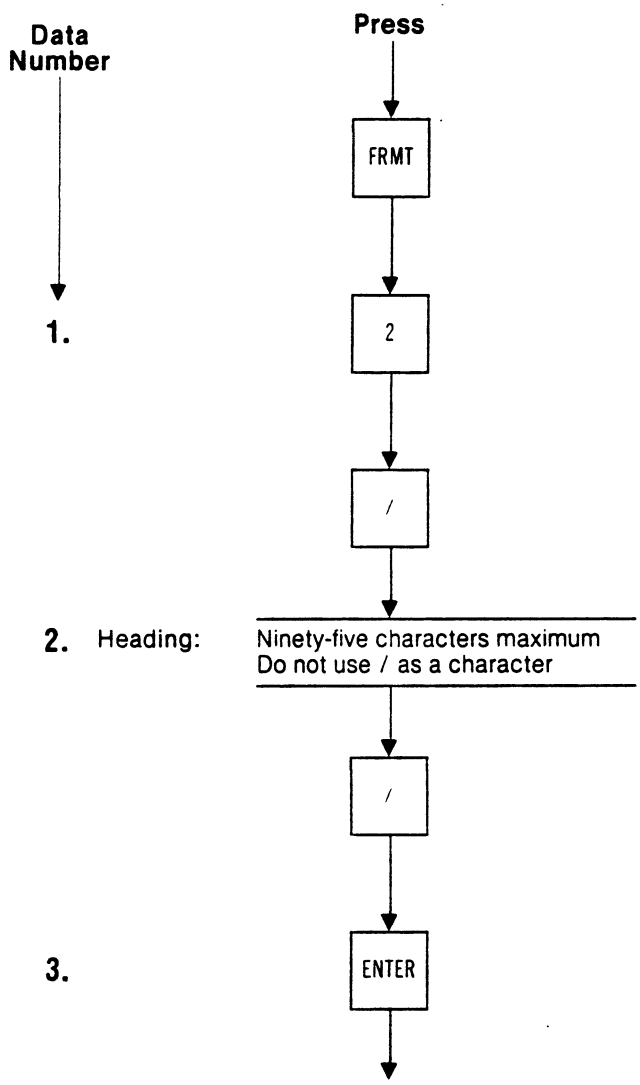
/

11. ENTER

Information is stored and printed on the chart. ENTR shows in the lower display. Either press the next function key to continue the configuration, or, if the configuration is complete, and the Reporter is installed, press RUN.

NOTES:
1. The page heading is printed at the top of a page of measured variable values printed in the TABULAR print format. Its intent is to identify the page of data.
2. If you find an error in the heading after you press [ENTER], you must repeat the key sequence and re-enter *all* the characters in the heading.

Page Heading (for TABULAR print format)



Information is stored and printed on the chart. ENTR shows in the lower display. Either press the next function key to continue the configuration, or, if the configuration is complete,

and the Reporter is installed, press the [RUN] key.

NOTES:

1. Configure three speeds now; then choose one of the three during operation.
2. The chart speed to obtain a specific number of measured variable or deviation print-outs per hour can be calculated by using the following formulas:

   0.112 × print-outs/hour = chart speed in inches/ hour (round off to the nearest whole number)

   0.28 × print-outs/hour = chart speed in centimeters/hour (round off to the nearest whole number.
3. If you establish a slow chart speed, the printhead will spend most of the time sitting at one end of the chart, waiting for the time to print.
4. If your reporter has six-color printing, and if you require a chart speed faster than 35 inches/hour, use Table 8 to determine the number of print colors you can include in a print group; then, use Table 9 to make sure the channel combination in a print group does not use more than the determined number of colors.

Example 1
Assume the desired chart speed for Channels 1, 2, 3, 4, 13 and 22, which comprise Print Group 1, is 45 inches/ hours.

From Table 8, the maximum number of print colors is four.

From Table 9, the channel combination uses four colors; so, the 45 inches/ hour is all right.

Example 2
Assume the desired chart speed for Channels 1, 2, 3, 4, 13 and 22, which comprise Print Group 1, is 60 inches/ hours.

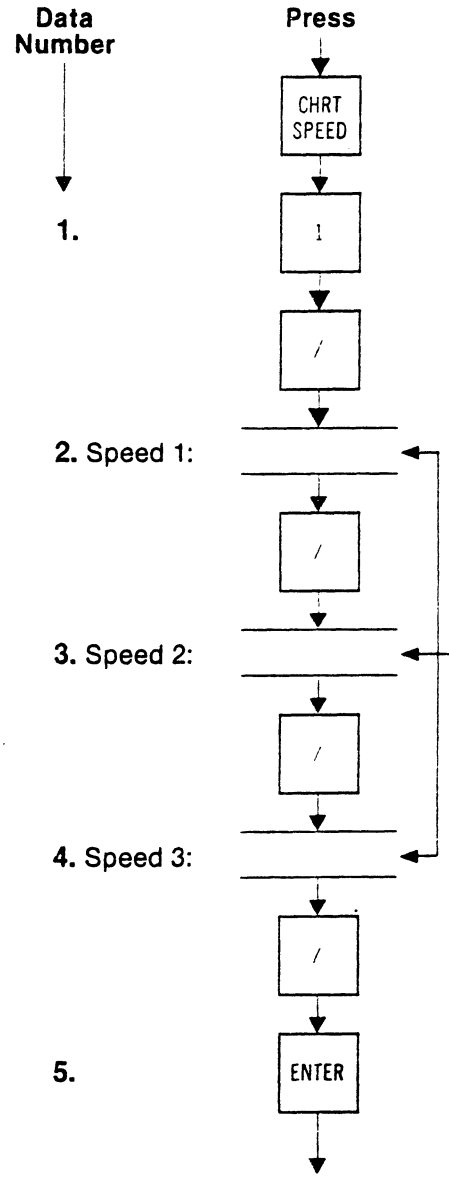
From Table 8, the maximum number of print colors is three.

From Table 9, the channel combination uses four colors; so, either the chart speed must be reduced to 50 inches/ hour, or the inputs must be changed to a combination of channels that does not use more than three colors.

TABLE 8 - Number of Print Colors

Maximum Chart Speed		
in/hr	cm/hr	Number of Print Colors
100	254	1
80	200	2
60	150	3
50	127	4
40	100	5
35 (or less)	89 (or less)	6

Chart Speeds (for TREND print format)



Choose up to 3 chart speeds in whole numbers based on the limits in Table 8 and the units established earlier.

Information is stored and printed on the chart. ENTR shows in the lower display. Either press the next function key to continue the configuration, or if the configuration is complete,

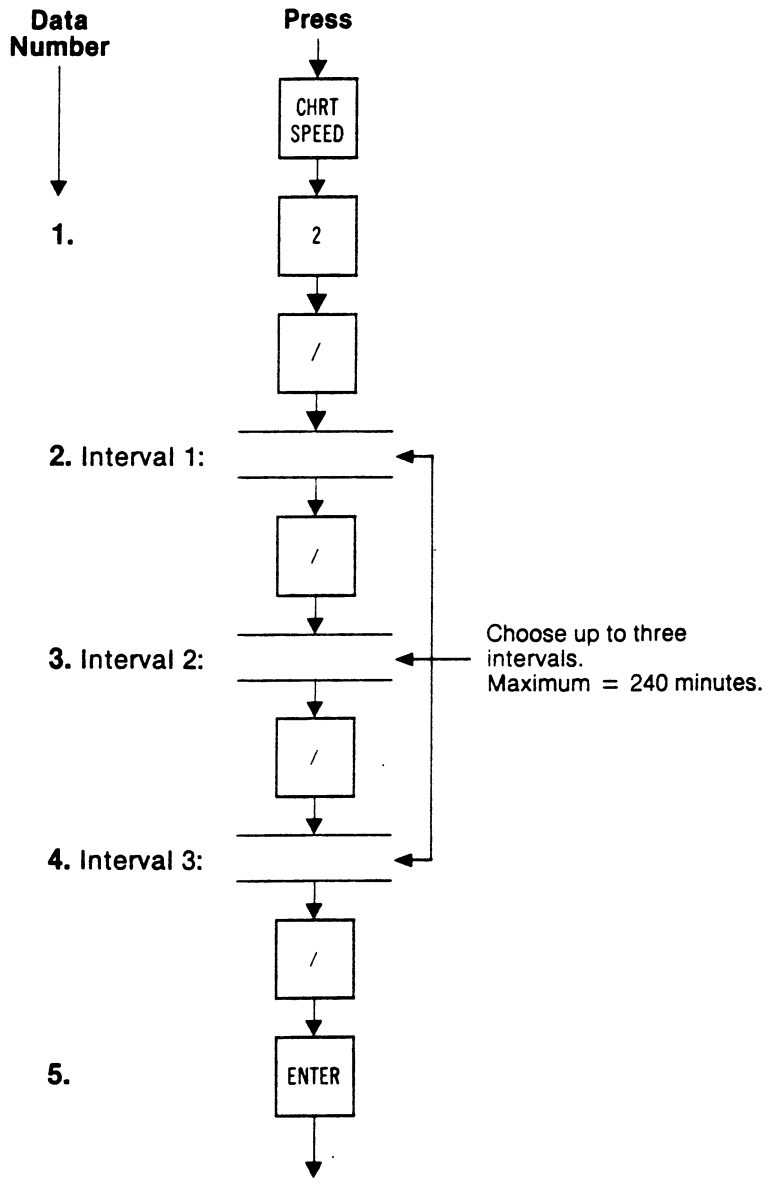
and the Reporter is installed press the RUN key.

TABLE 9 - Channel Print Colors

Purple	Red	Blue	Green	Brown	Orange
1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30

NOTES:
1. Configure three intervals now; then choose one of the three during operation.
2. If you choose an interval of 0, the print interval will be 0.25 minutes.
3. Intervals must be in whole numbers.

Time Between Prints (for TABULAR print format)



Information is stored and printed on the chart. ENTR shows in the lower display. Either press the next function key to continue the configuration, or if the configuration is complete,

and the Reporter is installed press the RUN key.

NOTES.
1. Do not include in either Group 1 or Group 2 any channel number configured with input type 0 during Channel Data configuration.
2. You can either include or exclude a channel in both groups.
3. If you are only going to include a few channel numbers in a group, configure *all* channels with a Group Use code of 0; then reconfigure the channel numbers you want to include in the group with a Group Use code of 1.
4. If you are only going to exclude a few channel numbers from a group; configure *all* channel numbers with a Group Use code of 1; then re- configure with a Group Use code of 0 the channel numbers you want to exclude.
5. On Reporters with six-color printing, channels that can be included in a print group are restricted if the chart speed is greater than 35 inches/hour (8 centimeters/hour. See NOTE 4 on page 13.)

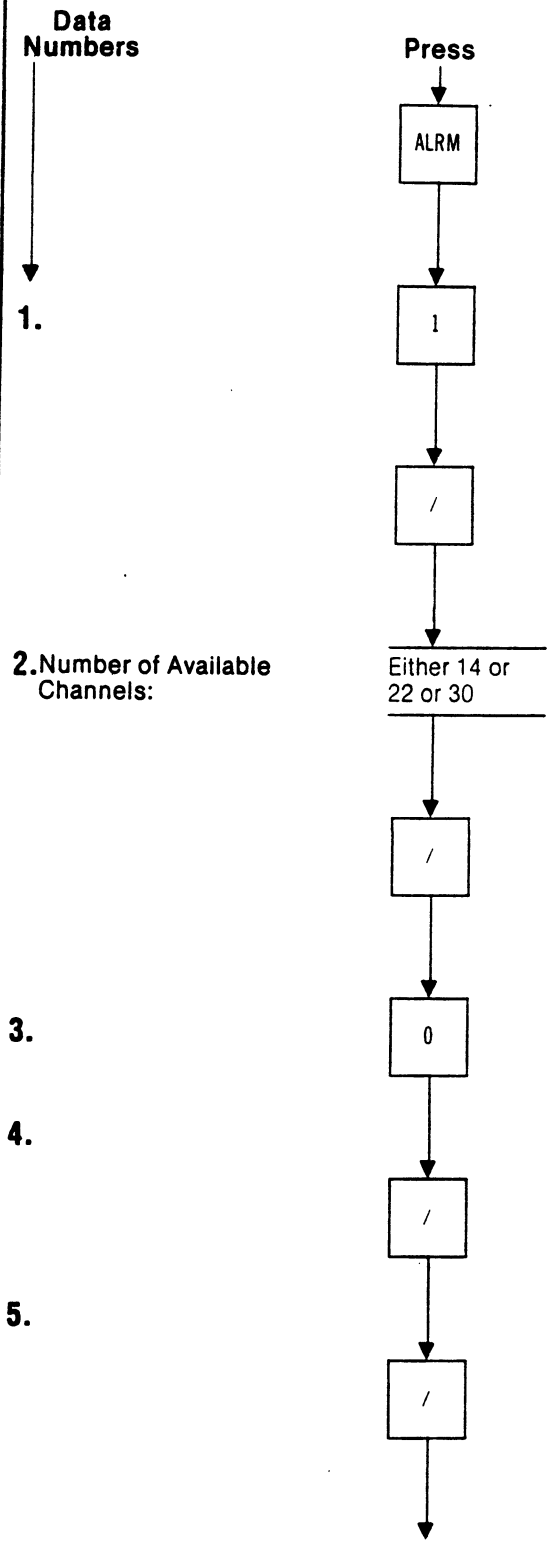
Print Groups (for all print formats)

Data Number	Press
	PRINT GRP
1. Group Number:	Either 1 or 2
	/
2. Channel Number:	Single channel number or first channel number in a sequence of consecutive channel number in print the group.
3. Channel Number:	Same channel number as above single channel number or last channel number in the above sequence.
	/
4. Group Use (code):	0 if channel number excluded from the group 1 if channel number is included in the group.
	/
5.	ENTER

Information is stored and printed on the chart. ENTR shows in the lower display. Either press the next function key to continue the configuration, or, if the configuration is complete and the Reporter is installed, press the RUN key.

NOTE:
If only a few channels are to have alarms configured, use this key sequence to configure all channels not to be used; then use the key sequence on page 18 to configure the channels that are to have alarms.

Alarms (for all print formats)



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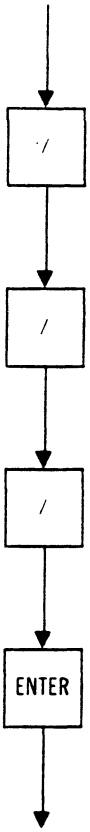
Alarms (continued)

6.

7.

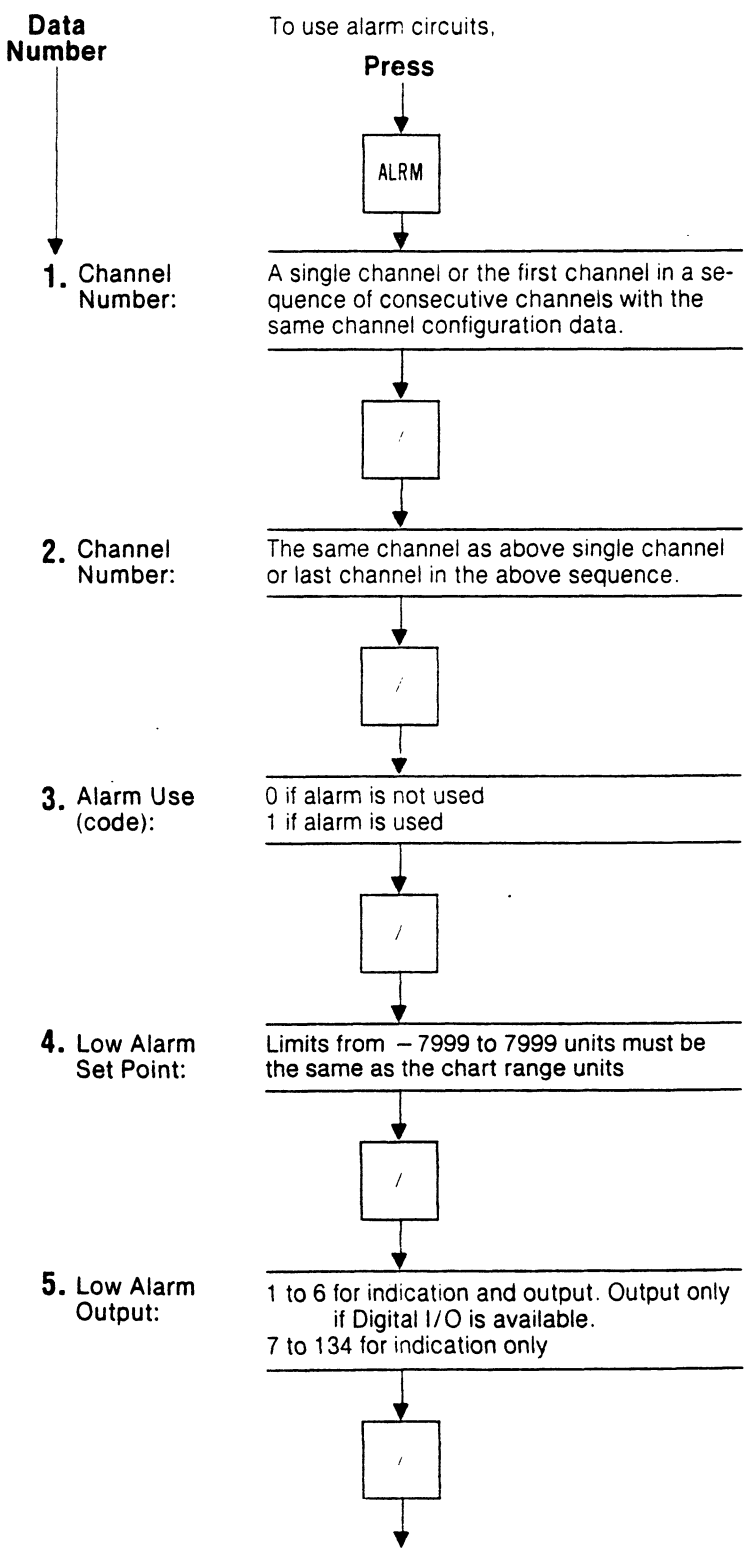
8.



Information is stored and printed on the chart. ENTR shows in the lower display. Either press the next function key to continue the configuration, or, if the configuration is complete and the Reporter is installed, press the RUN key.

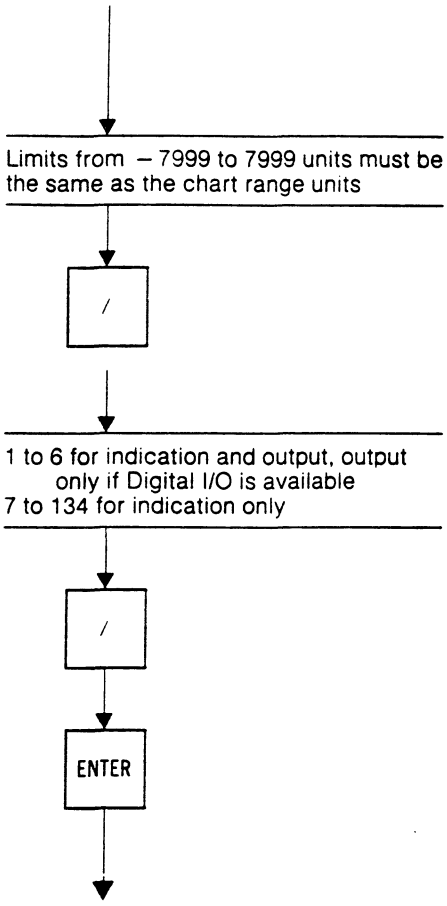
NOTES:
You can assign the same alarm outputs to any channel and to both low and high alarm.

Alarms (continued)


Data Number
To use alarm circuits,
Press
ALRM
1. Channel Number:
A single channel or the first channel in a sequence of consecutive channels with the same channel configuration data.
/
2. Channel Number:
The same channel as above single channel or last channel in the above sequence.
/
3. Alarm Use (code):
0 if alarm is not used
1 if alarm is used
/
4. Low Alarm Set Point:
Limits from −7999 to 7999 units must be the same as the chart range units
/
5. Low Alarm Output:
1 to 6 for indication and output. Output only if Digital I/O is available.
7 to 134 for indication only
/

continued on following page

Alarms (continued)

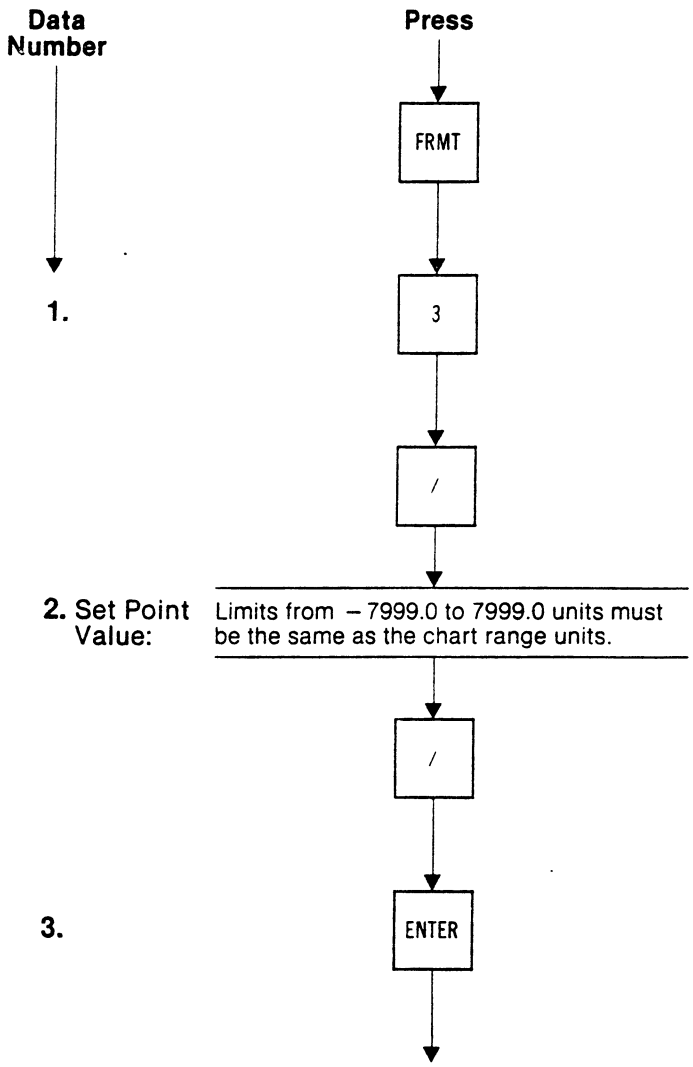

6. High Alarm Set Point:
Limits from – 7999 to 7999 units must be the same as the chart range units
/
7. High Alarm Output:
1 to 6 for indication and output, output only if Digital I/O is available
7 to 134 for indication only
/
8.
ENTER

Information is stored and printed on the chart. ENTR shows in the lower display. Either press the next function key to continue the configuration; or if the configuration is complete,

and the Reporter is installed, press the RUN key.

NOTES:
1. Configure the deviation set point only if you configured one of the channels to record the deviation from a set point. See channel data configuration.
2. The value of the set point must be within the measured variable limits of the input type assigned to the channel.

Deviation Set Point (for all print formats)



Information is stored and printed on the chart. ENTR shows in the lower display. Either press the next function key to continue the configuration, or if the configuration is complete,

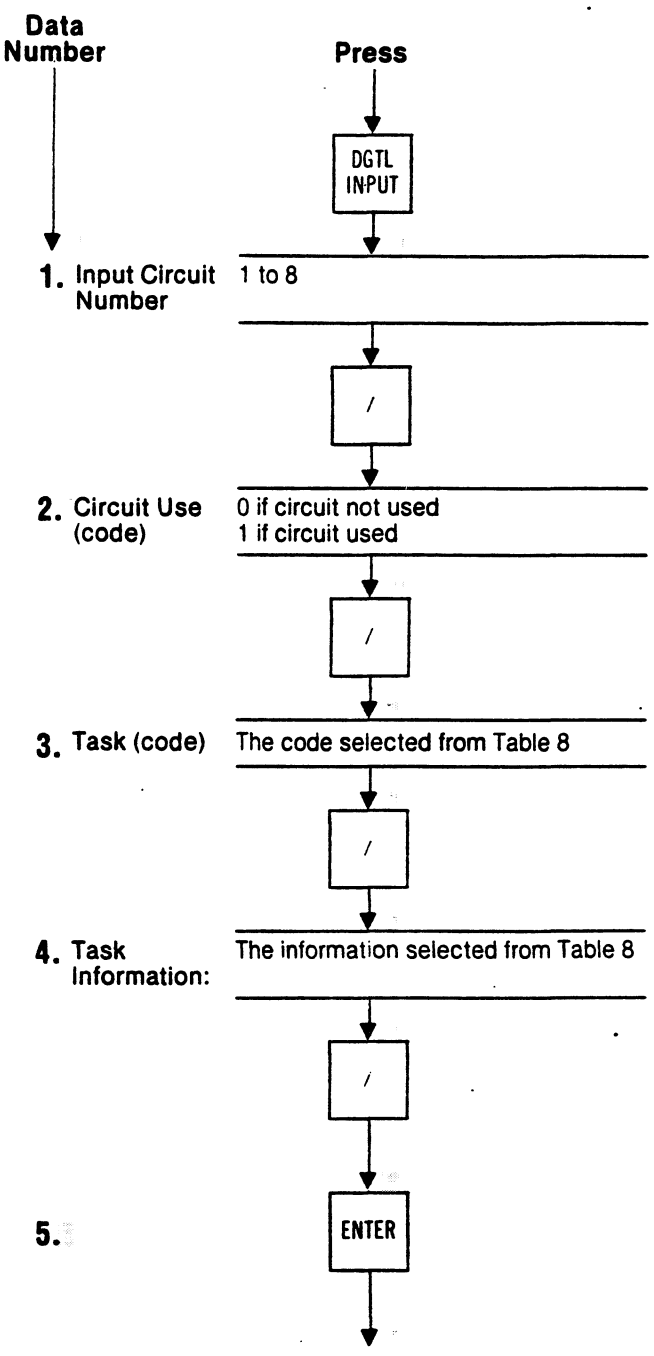
and the Reporter is installed, press the RUN key.

NOTES:
1. Configure the digital inputs only if the digital input/output option is installed on the Reporter.
2. Configure input circuit numbers not to be used with a circuit use code of 0.

TABLE 8 — Tasks and Task Information for Digital Input Circuits

Task	Task Code	Task Information
Print a message on the chart	1	(Do not use / as a character) Up to thirteen characters. If the first three characters are TTT, the time will be printed in place of TTT.
Change to another printing format	2	1 for TREND format printing 2 for TABULAR format printing
Change to another chart speed	3	Use the number of the speed
Change to another print group	4	Use the number of the print group
Reset all of the alarm circuits	5	
Stop the printing	6	
Change to remote select chart range	7	

Digital Inputs (for all print formats)



Information is stored and printed on the chart. ENTR shows in the lower display. Either press the next function key to continue the configuration, or if the configuration is complete, and the Reporter is installed, press the RUN key.

Configuration Summary

Appendix A

Configuration Summary Stored at the Factory

DATE: (day and month) TIME: (hour and minutes)

INSTRUMENT OPTIONS: ANALOG CHAN: (14, 22, or 30), PRINT COLORS: (0 for one, 1 for six), DIGITAL I/O: (0 without, 1 with), EXT COMM: 0

RTD OPTION: (0 without, 1 with). METRIC: 0, LATCHED OUTPUTS: 1

CHART RANGE LIMITS:

		KEYBOARD		REMOTE	
RANGE #	RANGE	LOWER	UPPER	LOWER	UPPER
1	RNG01	0.00	100.00	0.00	100.00
2	RNG02	0.00	250.00	0.00	250.00
3	RNG03	0.00	1600.00	0.00	1600.00
4	RNG04	0.00	1000.00	0.00	1000.00

PAGE TITLE: DPR TEST CONFIGURATION. SALES ORDER NUMBER (actual sales order number)

CHANNELS

CHAN	DATA CODE	INPT TYPE	FILT	CHART RANGE	UTS MESR	RANGE LIMITS UPPER	RANGE LIMITS LOWER	TAG NUM	PRINT GROUP 1	PRINT GROUP 2	ALARM USE	LOW ST PT	LOW OUTPUT	HIGH ST PT	HIGH OUTPUT
1	0	3	0	1	MV	100.00	0.00	CH1	1	1	0	- 5.00	1	105.00	2
2	0	12	0	3	°F	1600.00	0.00	CH2	1	0	0	-80.00	1	1680.00	2
3	0	4	0	1	VLT	999.99	0.00	CH3	1	0	0	-50.00	1	1050.00	2
4	0	2	0	1	MV	250.00	0.00	CH4	1	0	0	-12.00	1	252.00	2
5	0	1	0	1	MV	100.00	0.00	CH5	1	0	0	- 5.00	1	105.00	2
6	0	1	0	1	MV	100.00	0.00	CH6	1	1	0	- 5.00	1	105.00	2
7	0	3	0	1	MV	100.00	0.00	CH7	1	0	0	- 5.00	1	105.00	2
8	0	1	0	1	MV	100.00	0.00	CH8	1	0	0	- 5.00	1	105.00	2
9	0	3	0	1	MV	100.00	0.00	CH9	1	0	0	- 5.00	1	105.00	2
10	0	1	0	1	MV	100.00	0.00	CH10	1	0	0	- 5.00	1	105.00	2
11	0	3	0	1	MV	100.00	0.00	CH11	1	1	0	- 5.00	3	105.00	4
12	0	1	0	1	MV	100.00	0.00	CH12	1	0	0	- 5.00	3	105.00	4
13	0	3	0	1	MV	100.00	0.00	CH13	1	0	0	- 5.00	3	105.00	4
14	0	1	0	1	MV	100.00	0.00	CH14	1	0	0	- 5.00	3	105.00	4
15	0	3	0	1	MV	100.00	0.00	CH15	1	0	0	- 5.00	3	105.00	4
16	0	1	0	1	MV	100.00	0.00	CH16	1	1	0	- 5.00	3	105.00	4
17	0	3	0	1	MV	100.00	0.00	CH17	1	0	0	- 5.00	3	105.00	4
18	0	1	0	1	MV	100.00	0.00	CH18	1	0	0	- 5.00	3	105.00	4
19	0	3	0	1	MV	100.00	0.00	CH19	1	0	0	- 5.00	3	105.00	4
20	0	1	0	1	MV	100.00	0.00	CH20	1	0	0	- 5.00	3	105.00	4
21	0	3	0	1	MV	100.00	0.00	CH21	1	1	0	- 5.00	5	105.00	6
22	0	1	0	1	MV	100.00	0.00	CH22	1	0	0	- 5.00	5	105.00	6
23	0	3	0	1	MV	100.00	0.00	CH23	1	0	0	- 5.00	5	105.00	6
24	0	1	0	1	MV	100.00	0.00	CH24	1	0	0	- 5.00	5	105.00	6
25	0	3	0	1	MV	100.00	0.00	CH25	1	0	0	- 5.00	5	105.00	6
26	0	1	0	1	MV	100.00	0.00	CH26	1	1	0	- 5.00	5	105.00	6
27	0	3	0	1	MV	100.00	0.00	CH27	1	0	0	- 5.00	5	105.00	6
28	0	1	0	1	MV	100.00	0.00	CH28	1	0	0	- 5.00	5	105.00	6
29	0	3	0	1	MV	100.00	0.00	CH29	1	0	0	- 5.00	5	105.00	6
30	0	1	0	1	MV	100.00	0.00	CH30	1	0	0	- 5.00	5	105.00	6

DEVIATION: REFERENCE CHANNEL 1:, SET POINT: 0.00

NUMBER	CHART SPEEDS	TIME BETWEEN PRINTS
1	40.00	5.00
2	10.00	0.00
3	20.00	10.00

REMOTE SELECTION OF TASKS:

NUMBER	USE	TASK	TASK INFORMATION
1	1	1	HONEYWELL INC.
2	1	1	-DPR 1500-
3	1	2	1
4	1	3	2
5	1	4	2
6	1	5	
7	1	6	
8	1	7	

Assigned Measured Variable Range Limits

Appendix B

NOTE: The need to calculate range limits as shown here applies only to certain kinds of measured variables. See page 11 of this section for details.

Example: The examples in the following procedure are based on an application (shown in figure 1) in which the user is measuring pressure in the range of 0–600 PSI. A transmitter converts the 0–600 PSI measured variable to a corresponding input range of 1–5 volts (that is 0 PSI = 1 volt and 600 PSI = 5 volts). The Reporter doesn't have a 1–5 volt range, but it does have a 0–10 volt range which is the input range that the user would configure the channel for.

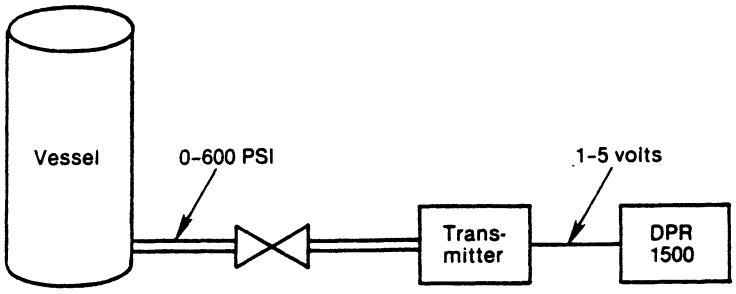


Figure 1—DPR 1500 in pressure recording application

How To Calculate Range Limits:

1. Calculate the span of the measured variable.

Span of measured variable = Upper Range Value − Lower Range Value.

EXAMPLE: With a range of 0–600 psi,
Span of measured variable = 600 psi − 0 psi = 600 psi.

2. Calculate the span of the input signal.

Span of input signal = upper range value − lower range value.

EXAMPLE: Span of input signal = 5 volts − 1 volt = 4 volts

3. Divide the span of the measured variable by the span of the input signal.

EXAMPLE: $\frac{\text{Span of measured variable}}{\text{Span of input signal}} = \frac{600 \text{ psi}}{4 \text{ volts}} = 150 \text{ psi/volt}$

The answer tells how many PSI are equivalent to 1 volt. This value will be used to construct a graph from which you will determine the range values.

4. Using whole numbers, construct a graph that shows each value of the Reporter's input range (the one the signal is being configured for).

For the application example shown in Figure 1, this portion of the graph would appear as follows:

EXAMPLE:

Reporter's Input Range

Volts	0	1	2	3	4	5	6	7	8	9	10

5. Assign the lower and upper range values of the measured variable to their corresponding input voltage values.

Input Range of the Reporter

Volts	0	1	2	3	4	5	6	7	8	9	10
PSI		0				600					

Range Values of the Measured Variable

6. Using the answer calculated in step 3, determine the value of the measured variable for each value of the input range.

In the example each voltage increment is equivalent to 150 PSI.

Input Range of the Reporter

Volts	0	1	2	3	4	5	6	7	8	9	10
PSI	[−150]	0	150	300	450	600	750	900	1050	1200	[1350]

Measured Variable

7. Identify the highest and the lowest values of the measured variable on the graph.

These are the Reporter's upper and lower range values respectively. Enter these values into the Reporter in steps 8 and 9 on page 11. In the example shown here, those values are 1350 and −150 PSI.

Honeywell

DPR 1500
Digital Process Reporter

Configuration Worksheet

The number of blanks under each heading is the maximum number of characters for the data.
Fill in the blanks with the data determined by using the keystrokes sequences in the Configuration section.
The headings over the blanks are the same as those in the Configuration section.

Output Relay Latching and Units of Measurement for Chart Speed and Temperature

Security Code	Units of Meas (Code)	Output Relay Latching (Code)
CONF__ __ __ __ / / / / / /	____ /	____ / ENTER

Chart Ranges (for TREND Print Format)

Chart Range No.	Chart Range Title	Chart Range Values: Lower	Upper	Remote: Lower	Remote: Upper
FRMT 1 ____ /	↑	/ __ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /ENTER
FRMT 1 ____ /	↑	/ __ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /ENTER
FRMT 1 ____ /	↑	/ __ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /ENTER
FRMT 1 ____ /	↑	/ __ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /ENTER

__ __ __ __ __ __ __ __ __ __
__ __ __ __ __ __ __ __ __ __
__ __ __ __ __ __ __ __ __ __
__ __ __ __ __ __ __ __ __ __
__ __ __ __ __ __ __ __ __ __

Process Control Division, 1100 Virginia Drive, Fort Washington, PA 19034
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Channel Data (for ALL Print Formats)

Either a single channel number or the first channel number in a sequence of channels with the same configuration data

Either same single channel number above if a single channel, or the last channel number in a sequence of channels with the same configuration data.

		Kind of Data (Code)	Input Type (Code)	Inpt Fltr (Code)	Chrt Rng No.	Unit of Meas.	Assigned Range Limits Upper	Lower	Tag No.	
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER
CHAN	__ __ / __ __ /	____ /	__ __ /	____ /	____ /	__ __ __ /	__ __ __ __ __ /	__ __ __ __ __ /	__ __ __ __ __ __	/ENTER

Alarms (for ALL Print Formats)

Either a single channel number or the first channel number in a sequence of channels with the same configuration data.

Either same single channel number above if a single channel, or the last channel number in a sequence of channels with the same configuration data.

		Alarm Use (Code)	Low Set Point	Low Output	High Set Point	High Output	
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER
ALRM	__ __ / __ __ /	_____ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	__ __ __ __ /	ENTER

Deviation Set Point (for ALL Print Formats)

	Set Point
FRMT	3 / __ __ __ __ __ / ENTER

Digital Inputs (for ALL Print Formats)

	Input Crct No.	Use (Code)	Task (Code)	Task Information
DGTL INPUT	1	/____	/____	/__ __ __ __ __ __ __ __ __ __ __ __ __ / ENTER
DGTL INPUT	2	/____	/____	/__ __ __ __ __ __ __ __ __ __ __ __ __ / ENTER
DGTL INPUT	3	/____	/____	/__ __ __ __ __ __ __ __ __ __ __ __ __ / ENTER
DGTL INPUT	4	/____	/____	/__ __ __ __ __ __ __ __ __ __ __ __ __ / ENTER
DGTL INPUT	5	/____	/____	/__ __ __ __ __ __ __ __ __ __ __ __ __ / ENTER
DGTL INPUT	6	/____	/____	/__ __ __ __ __ __ __ __ __ __ __ __ __ / ENTER
DGTL INPUT	7	/____	/____	/__ __ __ __ __ __ __ __ __ __ __ __ __ / ENTER
DGTL INPUT	8	/____	/____	/__ __ __ __ __ __ __ __ __ __ __ __ __ / ENTER

Page Heading (for TABULAR Print Format)

FRMT 2 / _ _ _

Print Groups (for ALL Print Formats)

Either the number of a single channel or the first channel in a consecutive sequence of channels in the same group

Either the same single channel number above if a single channel, or the last channel in a consecutive sequence in the same group.

Group No. **Group Use (Code)**

PRINT GRP _____ /__ __ /__ __ /__ __ /_____ / ENTER
PRINT GRP _____ /__ __ /__ __ /__ __ /_____ / ENTER
PRINT GRP _____ /__ __ /__ __ /__ __ /_____ / ENTER
PRINT GRP _____ /__ __ /__ __ /__ __ /_____ / ENTER
PRINT GRP _____ /__ __ /__ __ /__ __ /_____ / ENTER
PRINT GRP _____ /__ __ /__ __ /__ __ /_____ / ENTER
PRINT GRP _____ /__ __ /__ __ /__ __ /_____ / ENTER
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DPR 1500
Digital Process Reporter

Operation

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Introduction

Honeywell's DPR 1500 Digital Process Reporter (the Reporter) should have been installed and configured according to instructions in other sections of the Product Manual.

The Reporter is easy to operate, and requires a minimum of operator interface after start-up.

This section explains the start-up procedure functions of the displays, indicators and keys while operating, how to display and change operating data, and how to perform other operating functions.

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Functions of the Displays, Indicators and Keys

See Figure 1 for the positions of the displays, indicators, and keys, and Tables 1 and 2 for their functions.

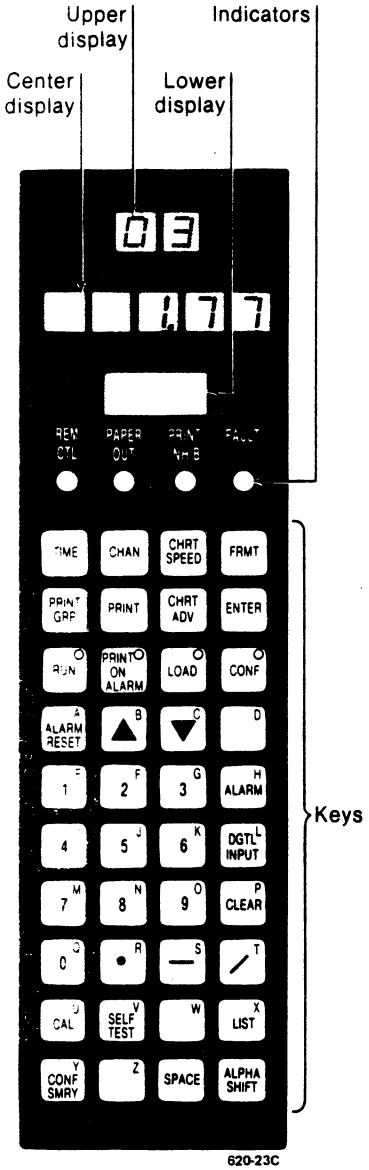


Figure 1 — Positions of the Displays indicators and Keys

TABLE 1 – Function of the Displays and Indicators

Display	Key Pressed	What is Displayed
Upper	CHAN	Channel number
	Either FRMT, CHRT SPEED or PRINT GRP	Currently active number
Center	CHAN	Measured variable
	TIME	Current hour and minute or month and day
	CHRT SPEED	Value of the chart speed or print interval.
Lower	CHAN	Units of measurement or mnemonics identifying a problem
	TIME	TIME or DATE
	FRMT and 1	TRND
	FRMT and 2	TABL
	CHRT SPEED	Either IN/HR or CM/HR or MIN

Indicators	Meaning When Lit
REM CTL	Not used
PAPER OUT	Roll of chart paper is used up.
PRINT INHIB	Remote contacts configured to stop printing are closed.

TABLE 2 – Function of the Keys

Key	Function when Pressed
TIME	Causes time in hours and minutes to be displayed in center display on first press. Changes the display to the month and day on second press.
CHAN	Causes a scan of all active channel numbers to start with last displayed channel number on first press. Stops the scan at the displayed channel number on second press. With ▲ or ▼ displays next or previous channel number.

NOTE: The remainder of the keys are not used in the operation of the Reporter. Their functions are stated in either the Configuration or Service sections of the Product Manual.

TABLE 2 (continued)

Key	Function when Pressed
CHRT SPEED	When printing in the TREND format, causes the currently selected chart speed to be displayed. When printing in the TABULAR format, causes the currently selected log interval to be displayed.
FRMT	Causes currently selected format number to be displayed.
PRINT GRP	Causes currently selected print group number to be displayed.
PRINT	Not active if PRINT INHIB indicator lit. When printing in TABULAR format, causes all active channels in currently selected print group to be printed. A page of data will be printed immediately; then the Reporter will return to printing at the selected log interval..
CHRT ADV	With ▲ or ▼ causes chart to advance or rewind.
ENTER	Unless locked out, used with other keys to change chart speed, log interval, format and print group.
RUN	Lights the indicator on first press, and places the Reporter in the RUN mode. Turns indicator off on second press, and takes the Reporter out of this mode.
PRINT ON ALARM	Lights the indicator on first press, and places the Reporter in the mode where it only prints data if the measured variable exceeds the Hi or Lo alarm set point. Turns the indicator off on second press and takes the Reporter out of this mode.
LOAD	Lights the indicator on first press, and stops the print-head drive and chart drive. Turns the indicator off on second press and takes the Reporter out of the load mode.
CONF	Used with the security code to place the Reporter in the configuration mode.
▲	Used with CHAN or CHRT ADV
▼	Used with CHAN or CHRT ADV
ALARM RESET	Resets all of the alarm output relays
1 through 3	Used with other keys to change chart speed, log interval, format and print group.

Start-Up

Make sure the Reporter is configured in accordance with the instructions in the Configuration section, and the roll of chart paper and the printwheel are installed in accordance with the Preparation section.

Procedure

Step	Action	Result of action
1	Apply power	Displays and indicators are blank while a self-check program is run; then, one of the following will occur (1) either a number with an E or D in front of it will show in the lower display or the FAULT indicator will light, requiring you to go to the Service section for instructions. (2) the PAPER OUT indicator lights, requiring you to replace the roll of chart paper. (3) the PRINT INHIB indicator lights, indicating the Reporter will not print until an external contact is opened. (4) both the LOAD and CONF indicators light, requiring you to go to Step 2. (5) only the RUN indicator lights, requiring you to go to Step 3. (6) both the RUN and LOAD indicators light, requiring you to go to Step 4.
2	Press RUN	Both the LOAD and RUN indicators light, requiring you to go to Step 4.
3	Press LOAD	Both the LOAD and RUN indicators light, requiring you to go to Step 4.
4	Use instructions in this section (Operation) for displaying operating data.	You know what operating data was selected for display, so you can either go to Step 5 and change it, or go to Step 6 to put the Reporter in the run mode.
5	Use instructions in this section (Operation) for changing operating data.	You select the operating data you want.
6	Press LOAD	The LOAD indicator goes out. Five seconds later the Reporter prints the date and a series of dot patterns to prove the printhead is functioning properly; then starts printing the selected data.

Displaying Operating Data

Press the keys listed with the headings. Data is shown in the displays as noted.

	Keys	Upper Display	Center Display	Lower Display
Time and Date	TIME	Blank	Current time (hour and minute)	TIME
	TIME	Blank	Current date (month and day)	DATE
Channel	CHAN	Channel numbers are displayed in order for five seconds.	Value of the measured variable	Either the units of the measured variable or one of the mnemonics listed below.
	CHAN	Displays the current channel number continuously.	Same as above	Same as above
	▼	Displays the previous channel number continuously	Same as above	Same as above
	▲	Displays the next channel number continuously	Same as above	Same as above
Print Format	FRMT	1 or 2	Blank	TRND OR TABL
Chart Speed	CHRT SPEED	Either 1 or 2 or 3	Stored value	Either IN/HR or CM/HR
Log Interval	CHRT SPEED	Either 1 or 2 or 3	Stored value	MIN
Print Group	PRINT GRP	Either 1 or 2	Blank	PG 1 or PG 2

Mnemonic	Meaning
OVLD –	either the input signal is too high to be integrated, or the input circuit is open
OVER –	the input signal can be integrated but is over the upper range limit
UNLD –	input signal is too low to be integrated
UNDR –	input signal can be integrated but is below the lower range limit
INIT –	data base invalid
RELF –	channel 1 has failed
FAIL –	auto calibration or reference junction sensor failed
HIGH –	measured variable exceeds high alarm set point
LOW –	measured variable exceeds low alarm set point

Changing Operating Data

NOTE: Data cannot be changed if switch 1 of the DIP switch on the central processor unit p.c. board assembly is ON.
Press the keys in the order listed with data headings. The data is shown in the displays as noted.

	Keys	Upper Display	Center Display	Lower Display
Print Format *Trend to Tabular*	FRMT	1	Blank	TRND
	2	2	Blank	TABL
	ENTER	2	Blank	TABL
Tabular to Trend	FRMT	2	Blank	TABL
	1	1	Blank	TRND
	ENTER	1	Blank	TRND
Chart Speed	CHRT SPEED	Either 1 or 2 or 3	The stored value	Either IN/HR or CM/HR
	1	1	The stored value	Either IN/HR or CM/HR
	or			
	2	2	The stored value	Either IN/HR or CM/HR
	or			
	3	3	The stored value	Either IN/HR or CM/HR
	ENTER	Either 1 or 2 or 3	The stored value	Either IN/HR or CM/HR
Log Interval	CHRT SPEED	Either 1 or 2 or 3	The stored value	MIN
	1	1	The stored value	MIN
	or			
	2	2	The stored value	MIN
	or			
	3	3	The stored value	MIN
	ENTER	Either 1 or 2 or 3	The stored value	MIN

	Keys	Upper Display	Center Display	Lower Display
Print Group	PRINT GRP	Either 1 or 2	Blank	PG 1 or PG 2
	1	1	Blank	PG 1
	or			
	2	2	Blank	PG 2

Advancing and Rewinding the Chart

The chart can be advanced and rewound only in the load mode. If the indicator on LOAD is not lit, press LOAD. After advancing or rewinding the chart, press LOAD to return to the previous mode. Use the keys in the following listing to advance, and rewind.

Advancing	CHRT ADV	▲
Stopping	Any key	
Rewinding	CHRT ADV	▼
Stopping	Any key	

Printing Data Only on Alarm

If the Reporter has the alarm circuits configured, press PRINT ON ALARM. Printing will occur only when either the alarm set points are exceeded, or OVLD or UNLD shows in the lower display.

Resetting the Alarm Relays

If the Reporter has the alarm relays configured to be latched on alarm, the relays can be unlatched (reset) by pressing ALARM RESET.

Positioning the Chart for TABULAR Format Printing

Use the Advancing and Rewinding the Chart instructions to position the chart so the small projection on the inside edge of the right tractor cover is between a pair of lines in the right margin of the chart. A pair of lines is printed every eight and one-half inches.

The chart is positioned so the page heading is printed just below a row of perforations and all channel data is printed before the next row of perforations.

Indications of Alarm Conditions on the Chart

In the TREND print format

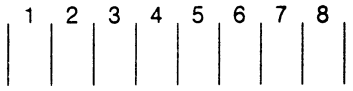
- A value outside the low alarm limit is distinguished by the superscript L on the channel number.
- A value outside the high alarm limit is distinguished by the superscript H on the channel number.

In the TABULAR print format

- A value outside the low alarm limit is distinguished by the superscript L on the value.
- A value outside the high alarm limit is distinguished by the superscript H on the value.

Printing of a Message Configured for a Digital Input

Think of the chart as divided in eight columns, with each column representing one of the eight digital inputs.



The message will be printed in the column corresponding to the number of the input.

Replacing the Roll of Chart Paper

Material Required

One inch (25 mm) of adhesive backed tape.

Roll of Chart Paper

One-Color Printing—Part Number 30752499-002

Six-Color Printing—Part Number 30752499-001

Tools Required

None

Procedure

(Figure 2)

1. With power on, press LOAD to light the indicator; then open the door and withdraw the chassis to the maintenance position.
2. Tear the chart across the perforations near the re-roll.
3. Push the re-roll tube to the left and remove it from the hubs.
4. Open the two tractor covers; then pull the remaining chart back through the guides.
5. To see the chart supply roll, pull the chart platen down.
6. Push the chart supply roll to the left and remove it from the hubs; then remove the remaining chart from the tube.
7. Install the empty tube in the re-roll hubs by using the tube to push the left hub; then align the slot in the right end of the tube with the key in the right hub. Close the chart platen.
8. With the chart unrolling from under the roll, install a new roll of chart paper on the supply hubs by using the roll to push the left hub; then align the slot in the right end with the key on the right hub.
9. Pull enough chart from the roll to reach the re-roll; then feed the end through the guides, and over the platen. Use the tape to attach the chart to the center of the tube.
10. Align the holes in the right side of the chart with the pins on the right tractor; then adjust the left tractor to align with the holes in the paper, and close the tractor covers.
11. Press CHRT ADV and ▲ to take up the slack in the chart or position the chart for TABULAR print format; then press any key to stop the chart drive.
12. Press LOAD to turn off indicator.

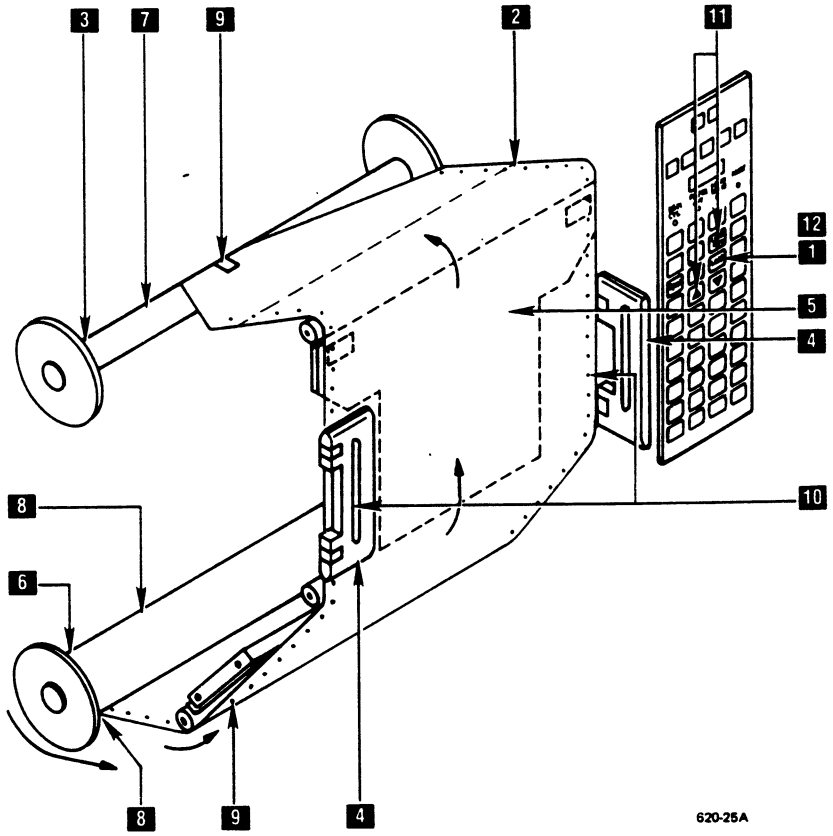


Figure 2 — Replacing the Roll of Chart Paper

Removing a Section of the Chart

Material Required
One inch (25mm) of adhesive-backed tape.

Tools Required
None

Procedure
(Figure 3)

1 With power on the Reporter,

press [LOAD] to light the indicator;

then open the door and withdraw the chassis to the maintenance position.

2 Press [CHRT ADV] then [▲] until

the section of the chart you want is on the reroll; then press any key to stop the chart drive.

3 Pull the chart from the reroll, crease at the first and last perforations closest to the ends of the section you want; then tear at the creases.

4 Press [CHRT ADV] then [▲] until

the end of the chart remaining on the platen is at the re-roll; then press any key to stop the chart drive.

5 Either remove the remaining chart from the re-roll tube and tape the end of the chart to the tube, or tape the end of the chart directly to the chart remaining on the re-roll tube.

6 Press [CHRT ADV] then [▲] to

either take up slack in the chart or position the chart for TABULAR print format; then press any key to stop the chart drive.

7 Press [LOAD] to turn off indicator

and take the Reporter out of the load mode.

NOTE: You can tear the sections of chart into 8½ x 11 sheets by tearing at the horizontal and vertical perforations.

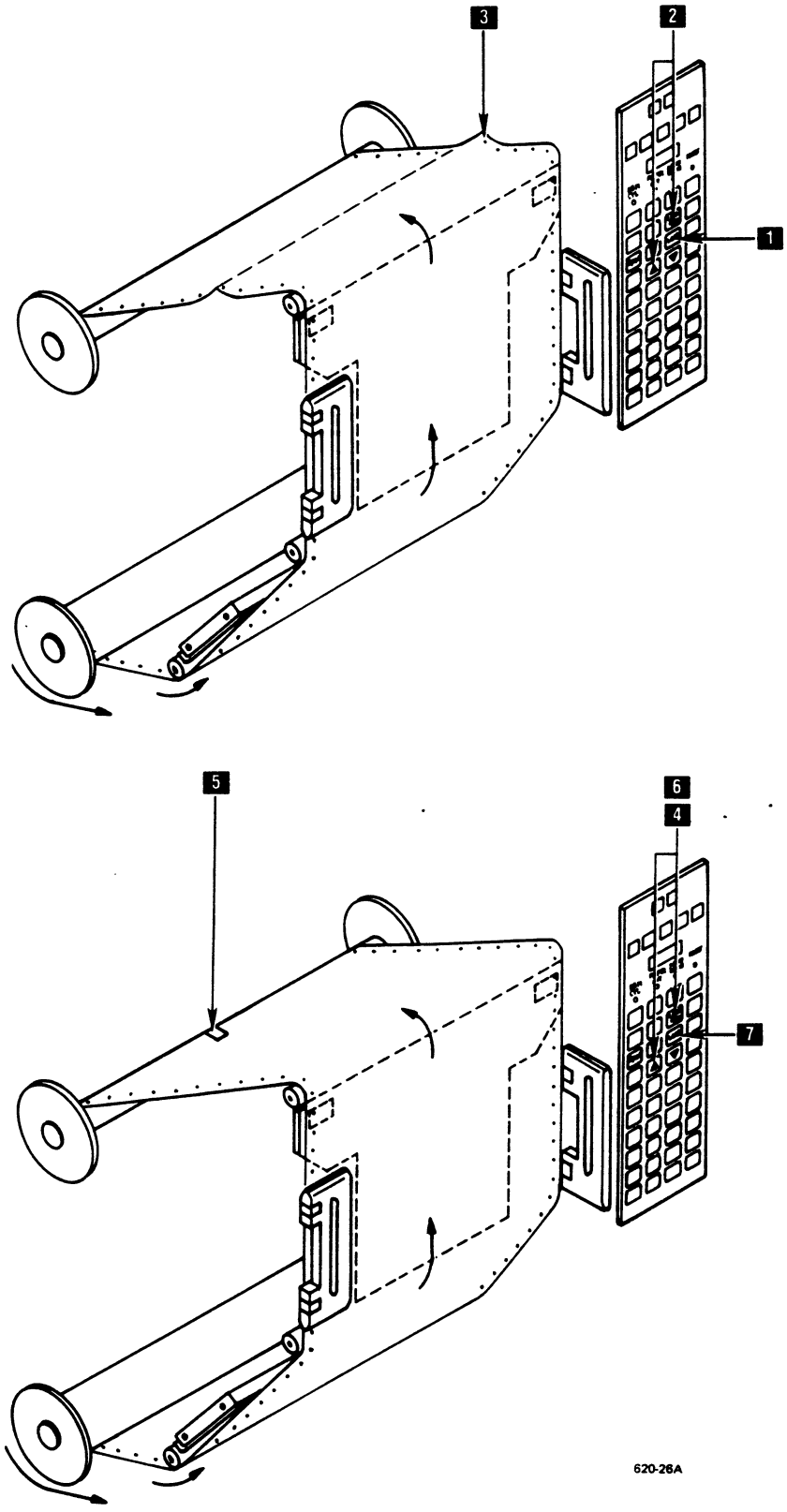


Figure 3 — Removing a section of the chart.

Replacing the Printwheel

See Figure 4 for instructions to remove the used printwheel.

See Figure 5 for instructions to install the new printwheel.

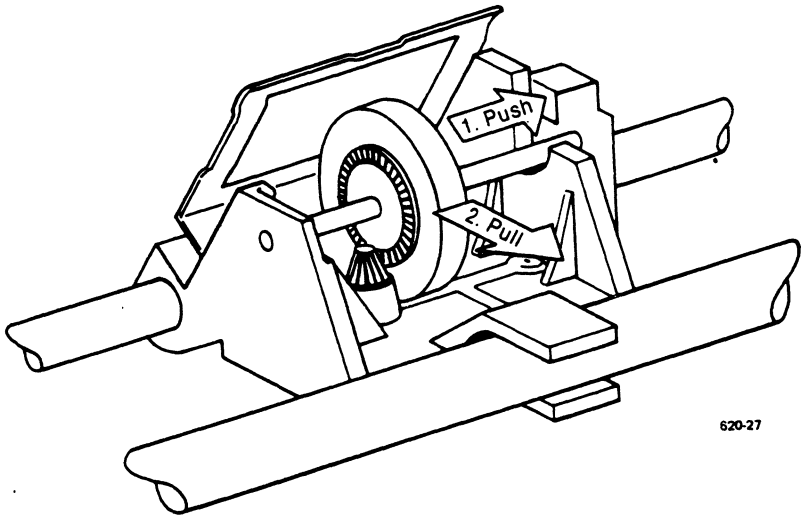


Figure 4 — Removing the used printwheel

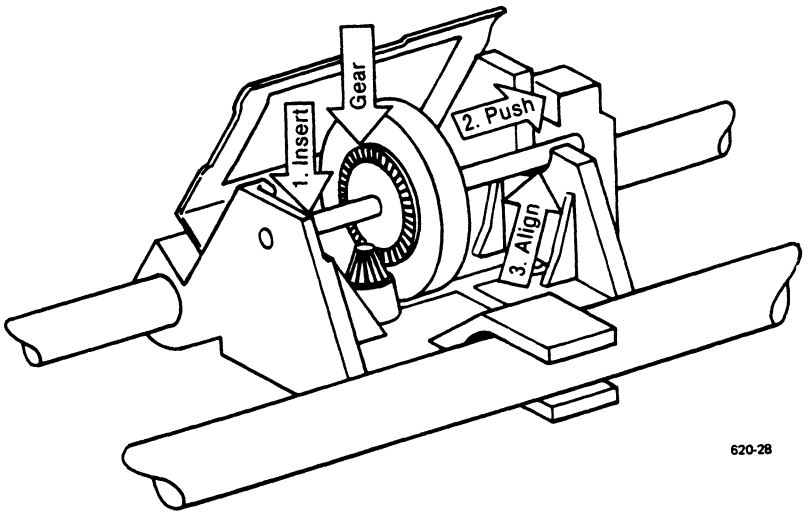


Figure 5 — Installing the new printwheel

DPR 1500
Digital Process Reporter

Service Data

Introduction

This section contains information about troubleshooting, testing adjusting, repairing, and calibrating the Digital Process Reporter.

The Reporter does not require any regularly scheduled maintenance procedures. Information about routine procedures such as installing chart paper or changing the inkwheel can be found in either the Preparation or Operation sections of this manual.

If you are not able to diagnose or correct a problem in your Reporter, contact your nearest Honeywell branch office.

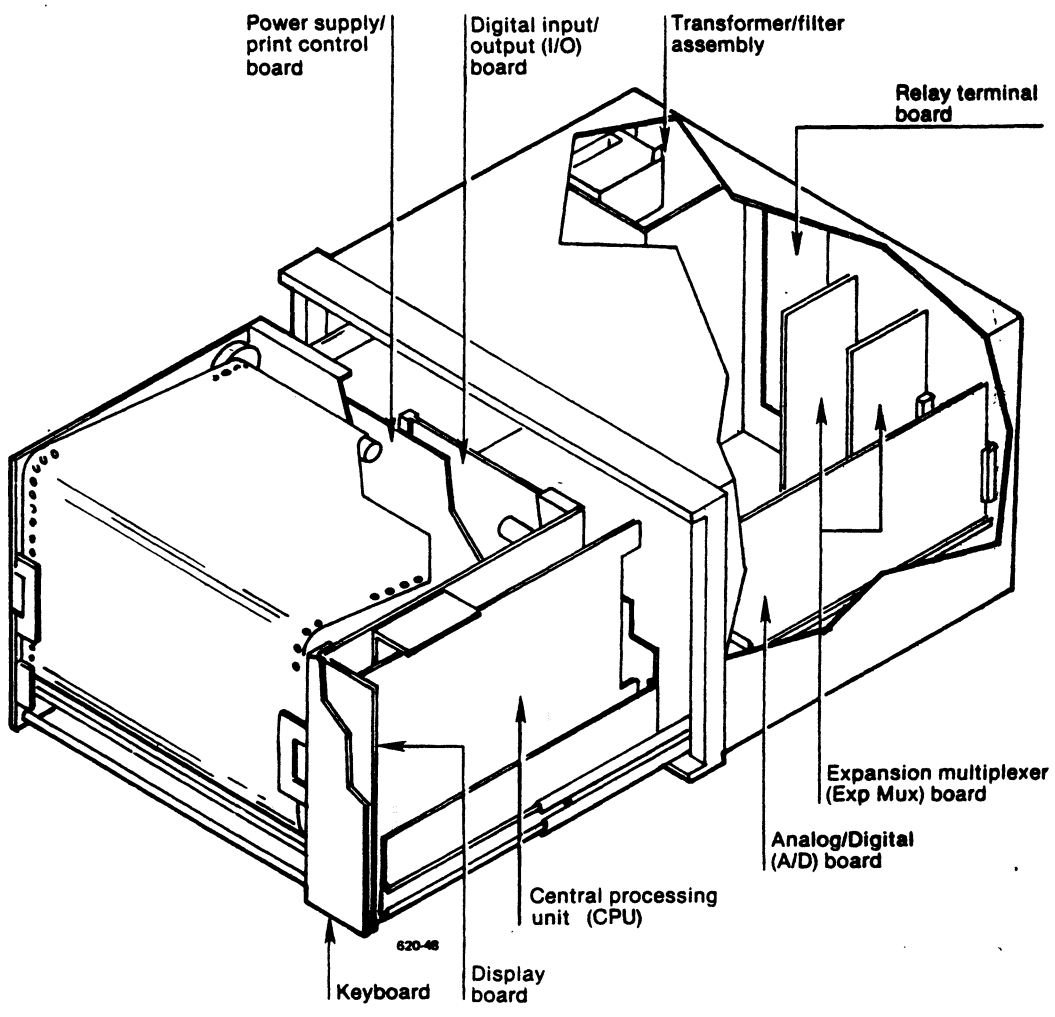


Figure 1—The electronic subsystem

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Troubleshooting—The Electronic Subsystem

You can troubleshoot almost all of the electronic subsystem (Figure 1) by measuring the transformer/filter assembly output voltage at the locations shown in Figure 2 and the LED, Power-up and Self-Test diagnostics described in TABLES 1, 2 and 3.

Every Reporter does not have all of the printed circuit boards shown in Figure 1. The digital I/O board and relay terminal board will only be found on instruments that have the digital I/O option. The expansion multiplexer board(s) are found only in 22 or 30-channel Reporters. The other boards are common to all Reporters.

Be mindful that a problem which may appear to be caused by a mechanical failure may in fact be caused by an electronic failure. By proceeding sequentially through the diagnostic charts in the tables, it is less likely that you will waste time by pursuing hunches that don't lead anywhere.

Preliminary Voltage Tests

Make the voltage tests in Figure 2 as the first step in a systematic troubleshooting procedure. These tests are important because the corrective actions prescribed in Tables 1, 2, and 3 assume that these voltages have been tested and are within tolerance ranges.

The purpose of these preliminary voltage tests is to check the output voltage from the transformer/filter assembly, as well as the wires that distribute this power to the other assemblies. If you find that one or more of these voltages is not within tolerance, refer to the Transformer/Filter Assembly Diagnostic Procedures on page 4. If you are able to verify that all of these voltages are within tolerance, continue troubleshooting by referring first to Table 1; then to Table 2; then to Table 3.

- Make these voltage checks on the plug end of each connector after disconnecting the plug from its receptacle.
- If you measure a voltage higher or lower than the limits indicated, refer to the Transformer/Filter Assembly Diagnostic Procedure on page 4.

J6—PS/PC board

Measure between cavities	Voltage should read between
1 & 6	29.8 & 36.6 Vdc
2 & 5	34.4 & 42.4 Vdc
4 & 3	15.0 & 29.0 Vdc

J1—A/D board

Measure between cavities	Voltage should read between
1 & 2	12.3 & 22.7 Vac
3 & 2	12.3 & 22.7 Vac
4 & 5	7.0 & 15.4 Vac

J3—Digital I/O board

Measure between cavities	Voltage should read between
1 & 2	22.5 & 37.5 Vac
3 & 4	22.5 & 37.5 Vac

Fan connector

Measure between cavities	Voltage should read between
1 & 2	29.8 & 36.6 Vdc

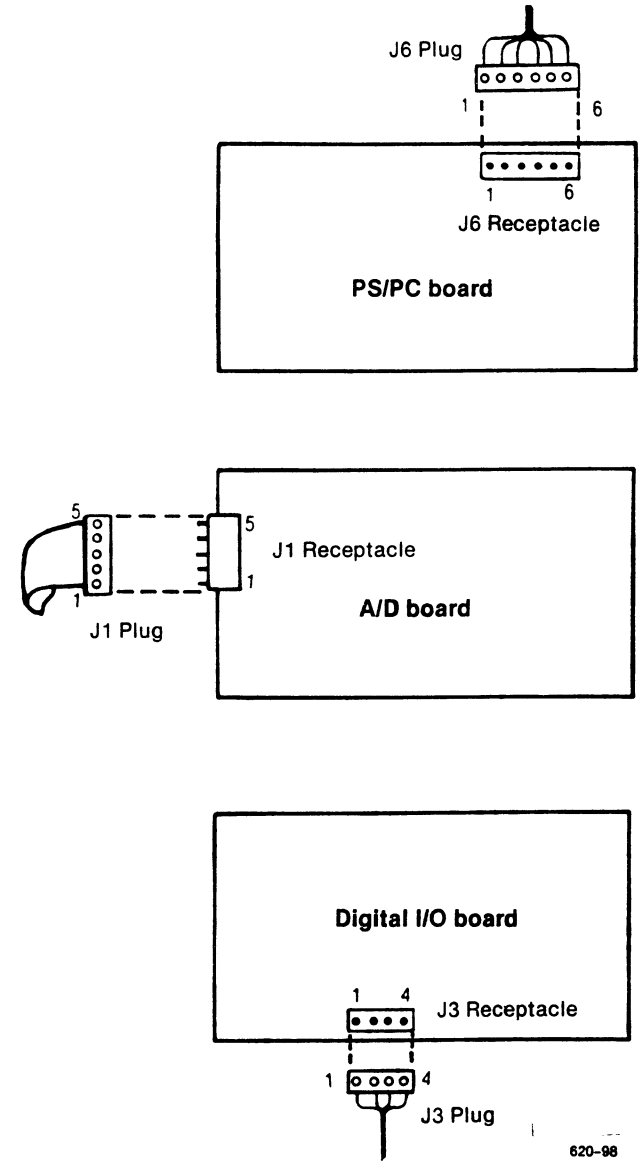


Figure 2—Measuring transformer/filter assembly output voltage

Transformer/Filter Assembly Diagnostic Procedures

(Refer to Figures 3 and 4 for the location of transformer/filter assembly components.)

Warning:
Turn off power to the Reporter before removing filter assembly. Line voltage and 660 VAC are present in transformer/filter assembly.

Problem:
One or more of the AC voltages measured on connectors J1 or J3 in the Preliminary Voltage Tests is out of tolerance.

Diagnostic Action:
1. Turn off power to the Reporter.
2. Remove the filter assembly (refer to removal procedures under Repair).
3. Look for frayed, burned, or open wiring. Replace if necessary.
4. Replace the linear transformer (part #30752721-501).

Problem:
The DC voltage measured between pins 1 and 6 of J6 and 1 and 2 of the fan connector in the Preliminary Voltage Tests is out of tolerance.

Corrective Action:
1. Turn off power to Reporter.
2. Remove the filter assembly (refer to removal procedure under Repair).
3. Check for frayed, burned, or open wiring. Replace if necessary.
4. Remove the 400 ohm, 25 watt resistor from the circuit.
5. Measure the resistor. It has a 20% tolerance, so it should read between 320 ohms and 480 ohms. If its resistance is out of tolerance, replace it (part #30732635-003).
6. Use standard troubleshooting techniques to pinpoint which of the following components has failed:

   -rectifier (part #30752976-001),
   -11000 microfarad capacitor (part #30752165-003),
   -4 microfarad capacitor (part #30752775-001),
   -ferro-resonant transformer (part #30752594-501).

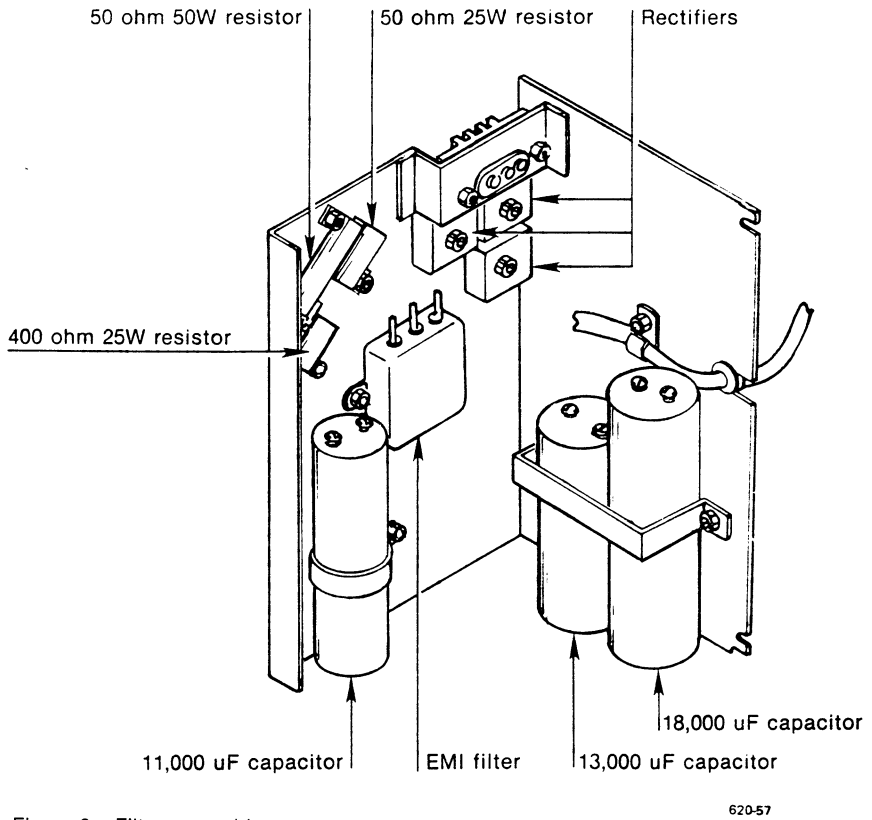


Figure 3—Filter assembly components

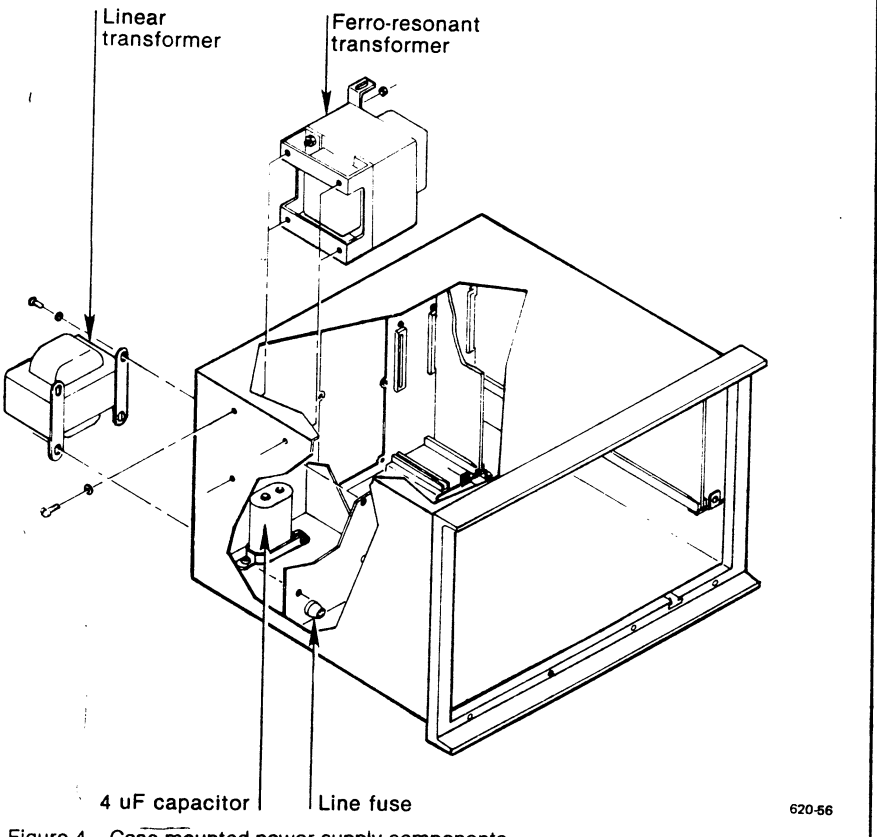


Figure 4—Case mounted power supply components

Problem:
The DC voltage measured between pins 2 and 5 of J6 in the Preliminary Voltage Tests is not within tolerance.

Corrective Action:
1. Turn off power to the Reporter.
2. Remove the filter assembly (refer to removal procedures under repair).
3. Check for frayed, burned, or open wiring.
4. Remove the 50 ohm, 50 watt resistor from the circuit.
5. Measure the resistor. It has a 20% tolerance, so it should read between 40 and 60 ohms. If its resistance is out of tolerance, replace it (part #30735937-004). If its resistance is within tolerance, go to step 6.
6. Use standard troubleshooting techniques to pinpoint which of the following components has failed:
   -rectifier (part #30752976-001),
   -18000 microfarad capacitor (part #30752165-001),
   -4 microfarad capacitor (part #30752775-001),
   -ferro-resonant transformer (part #30752594-501).

Problem:
The DC voltage measured between pins 4 and 3 of J6 in the Preliminary Voltage Tests is not within tolerance:

Corrective Action:
1. Turn off power to the Reporter.
2. Remove the filter assembly (refer to removal procedures under Repair).
3. Check for frayed, burned, or open wiring.
4. Use standard troubleshooting techniques to pinpoint which of the following devices has failed:
   -rectifier (part #30752976-001)
   -13000 microfarad capacitor (part #30752721-501)
   -linear transformer assembly (part #30752721-501).

LED Self-Diagnostics

Many of the Reporter's printed circuit boards have green or red LEDs to indicate the presence or absence of vital circuit voltages. When a board is operating properly, green LEDs are lit and red LEDs are not lit. Whenever the opposite condition occurs there is a circuit malfunction. Observation of the LED self-diagnostics should be the next step following the preliminary voltage tests. Figure 5 and 6 describe briefly the purpose of each LED.

Table 1 lists each circuit board that includes diagnostic LEDs. Use this table to determine the status of a diagnostic LED. If an LED indicates an abnormal status, take the corrective action indicated. Where several corrective actions are listed for one fault, the corrective actions should be performed one at a time in sequence. If the first board replacement fails to correct the problem, reinstall the original board, make the second board replacement, and so on. Replacement procedures for circuit boards are in the Repair section.

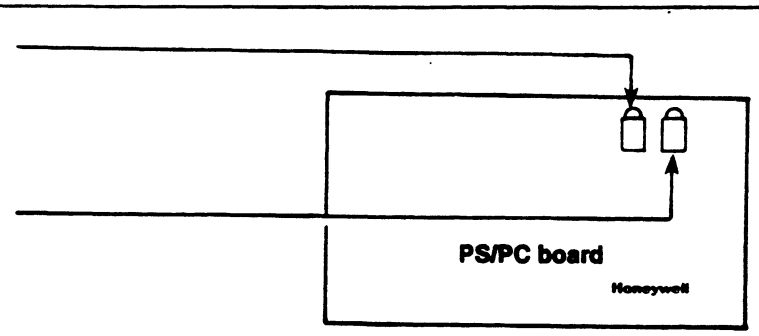
TABLE 1 - LED diagnostic chart

Circuit board	LED	Color	Normal Status	Abnormal Status	Corrective Action
Power Supply/Print Control	DS1	Green	Lit	Not lit	Check F13 and F14 (See Fuse Data). Replace PS/PC board. Replace CPU board[1]. Replace digital I/O board. Replace Display board. Replace Mother cable[2]. Replace cable that connects CPU and Display board.
Power Supply/Print Control	DS2	Green	Lit	Not lit	Replace PS/PC board. Replace CPU board[1]. Replace Mother cable[2].
A/D board	DS1	Red	Not lit	Lit	Replace A/D board[1].
	DS2	Green	Lit	Not lit	Replace A/D board[1].
I/O board	DS1	Green	Lit	Not lit	Replace I/O board.
	DS2	Green	Lit	Not lit	Replace I/O board.
Central Processing Board	DS1	Red	Not lit	Lit	Replace CPU board[1].
	DS2	Green	Lit	Not lit	Replace CPU board[1].
	DS3	Red	Not lit	Lit	Replace CPU board[1].
	DS4	Red	Not lit	Lit	Replace CPU board[1]. Replace cable that connects display board and CPU.
	DS5	Red	Not used.		

NOTES:
1. If you replace the CPU board, you must reconfigure and recalibrate the Reporter. Refer to CPU board replacement under Repair for reconfiguration details. See the Calibration section for calibration procedures.
2. Mother cable connects CPU, digital I/O, and PS/PC boards.
3. If you replace the A/D board, you must recalibrate the Reporter (see Calibration in this section).

DS1 —Indicator for +5 volt supply. If +5 volt supply is defective, the power-up diagnostic routine can not be run.

DS2 —Indicator for the reset signal. The 5 volt supply cannot be applied to the DPR circuit boards until the reset signal is generated.



DS1 —Indicator for watchdog timer reset

DS2 —Indicator for watchdog timer enable.

DS3 —Indicator for self-testing of the main processor (8085) and the diagnostic ROM (8755). This test must be completed successfully in order for the other power-up diagnostics to be run. Immediately after power-up, the LED is lit while the 8085 and 8755 are being tested. However, the light should go out within a few seconds of power-up to indicate that the test was successfully executed.

DS4 —Indicator for display board diagnostics

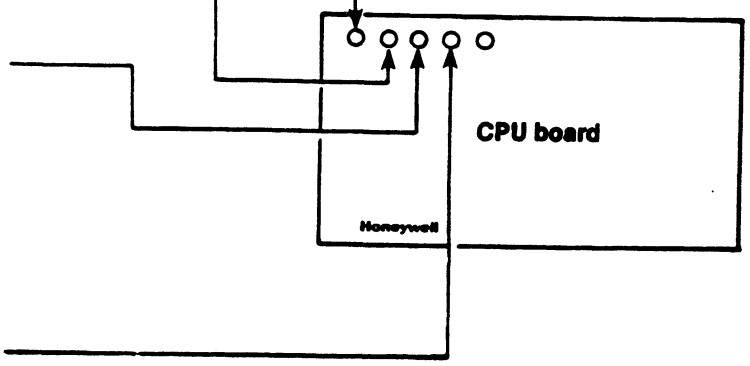
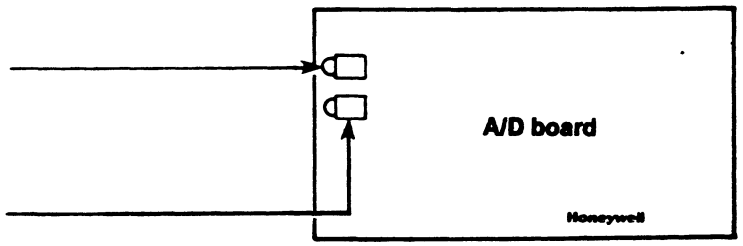


Figure 5—Diagnostic LEDs

DS1 —Indicator for A/D microcomputer reset. If it fails self-diagnostic test, LED remains lit.

DS2 —Indicator for 5 volt supply



DS2 —Indicator for 24 Vdc supply to input circuitry

DS1 —Indicator for 24 Vdc supply to output circuitry

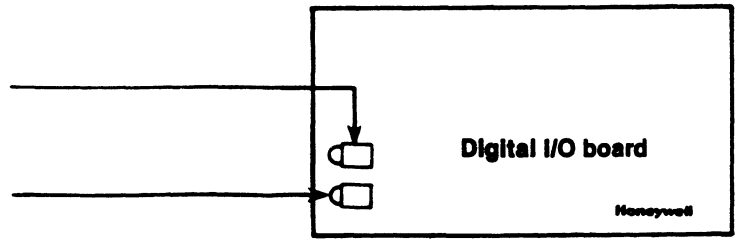


Figure 6—Diagnostic LEDs

620 50

Power-up Self Diagnostics

Power-up self-diagnostics is a microprocessor-controlled diagnostic program that automatically runs tests at power-up on selected circuitry within these functional subsystems:

Display,
CPU memory,
CPU miscellaneous,
Digital I/O,
A/D communication,
A/D and exp mux relay drivers,
Power supply and print control.

A failure within any of these subsystems will generate a power-up error code in the lower display (the one exception is a power supply/print control failure which is determined through the power-up message). A power-up error code (Figure 7) consists of the letter D and a two digit number that identifies the specific hardware circuit failure. Each error code can be identified with a printed circuit board failure. Table 2 lists these codes and corrective actions.

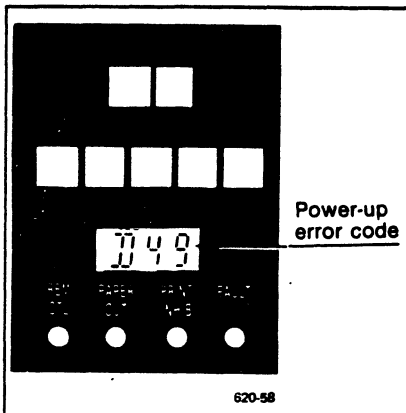


Figure 7—Power-up self-diagnostics

Error Specific Codes

In the case of error codes D00 and D01, circuit failures can be furthur pinpointed to specific integrated circuit devices. A program (ROM) or a data (RAM) memory circuit failure, D00 and D01 will generate an error specific code in the upper display (Figure 8) as well as the related power-up error code in the lower display. The error specific code identifies the specific ROM or RAM IC chip that failed. Figure 9 shows the location of the ROM and RAM IC chips on the CPU board. Use this figure to identify the integrated circuit represented by the error specific codes.

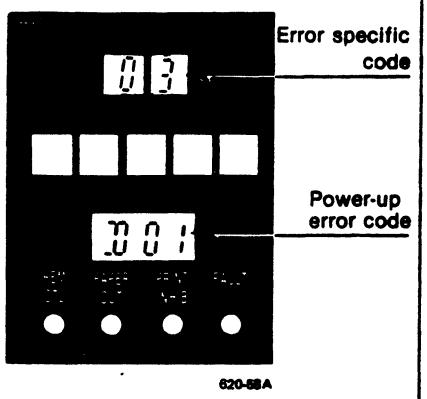


Figure 8—Power-up self-diagnostics

Power-up error code	Error specific code	IC
D00	00	U48
	01	U49
	02	U50
	03	U51
	04	U52
	05	U62

Power-up error code	Error specific code	IC
D01	00	U61
	01	U60
	02	U59
	03	U58

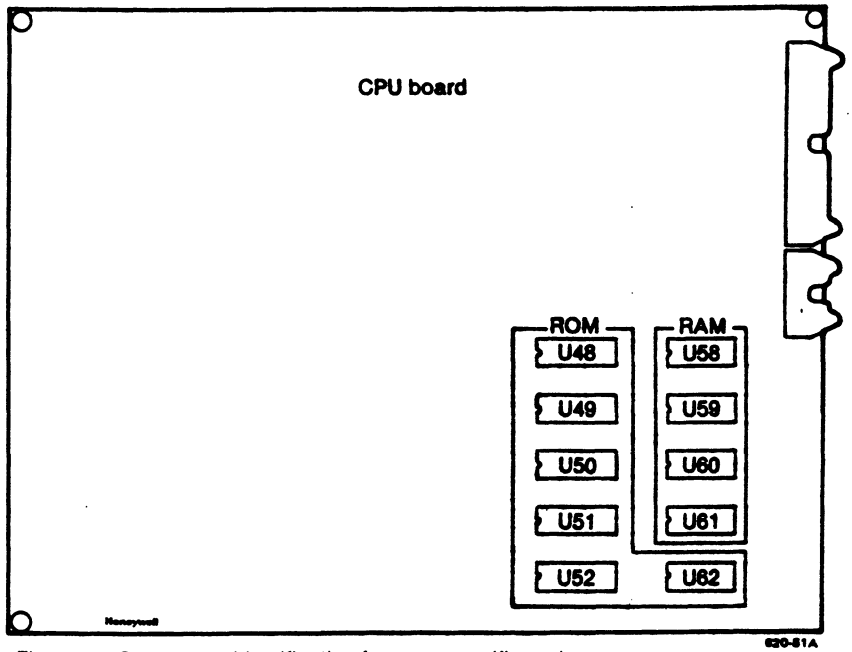


Figure 9—Component identification for error specific codes.

Sequence of Events at Power-Up

Each time you apply power to the DPR the following *visible* events occur in the sequence listed:

1. Status of CPU diagnostic configuration DIP switches is displayed,
2. Error codes are displayed if any failure is detected (sequence will stop here if diagnostic DIP switch #4 is in "On" position),
3. Scan motor is reset (moves to extreme left); (Fault LED goes on and code F1 appears in lower display if scan motor cannot be reset),
4. Power-up message is printed (Figure 10).
5. A keyboard LED will go on to identify the Reporter's mode of operation: either the mode the Reporter was previously in, or the configuration mode depending on the position of diagnostic configuration DIP switch S6.

Power-up Message

The power-up message provides for testing of the chart motor, scan motor and printing system. The first three parts of the message identify the versions of software in the Reporter. The last part of the message consists of eight special diagnostic characters that verify the operation of pins 1 through 8 (pin 9 is not used). The first character is produced by pin 1 firing. The next character is produced by pins 1 and 2 firing. The other characters are produced in a similar manner with an additional pin firing to print each successive character. Each pin is protected by a 1A fuse. If the printout of the diagnostic characters indicates that a particular pin is not firing, check the fuse for that pin (refer to page 13) as an initial diagnostic procedure. If replacing the fuse doesn't correct the fault use a systematic troubleshooting procedure for locating the problem beginning with the preliminary voltage checks on page one and then continuing on by using the LED diagnostic, power-up diagnostic and electromechanical troubleshooting charts.

Fatal Error Code (F01)

If the scan motor cannot be reset, the Reporter stops printing F01 appears in the lower display and the FAULT LED is lit. Do the following; (1) cycle power on and off (2) check PS/PC board (3) check power supply and scan reference sensor switch.

Diagnostics During Mode Transitions

A few of the circuits tested during the power-up diagnostic sequence are also tested during the transition from one mode of operation to another (for example, Configuration to Run). If an error is detected in one the these circuits at this time, as opposed to during power-up, an error code prefixed with the letter "E" will be displayed. The numeric part of the error code is identical to that for power-up diagnostics. For example an A/D communications problem at power-up would be displayed as D49, and during mode transitions as E49. (Do not confuse these error codes with the configuration and calibration error codes also prefixed with an "E" but followed by a 5.)

Interpreting Power-up Self-diagnostics

Table 2 lists all of the possible power-up diagnostic codes along with the identified malfunction and the action that should be taken to correct the failure. In some cases more than one corrective action is listed for a code. For example, refer to diagnostic code D10 in Table 2 where three independent corrective actions are listed for D10 beginning with, "Replace the display board." Where several corrective actions are listed for one code, these actions should be performed one at a time and in sequence. If the first board replacement corrects the problem you need go no further. If the first board replacement fails to correct the problem, reinstall the original board and make the second board replacement and so on.

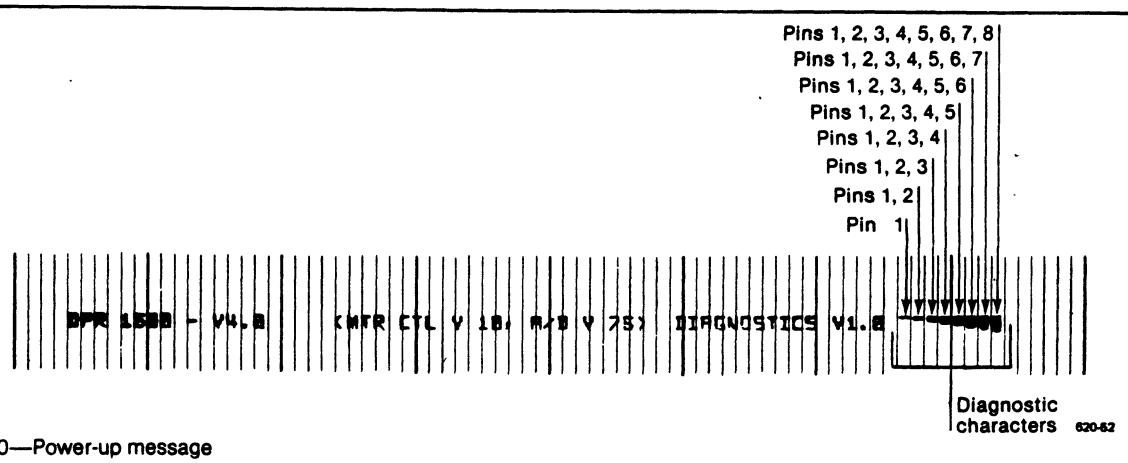


Figure 10—Power-up message

TABLE 2 - Power-up self-diagnostic chart

Diagnostic Code	Malfunction	Corrective Action
D00	Program memory (ROM) failure. Error specific code shown in upper display indicates ROM chip that failed.	Replace ROM chip or CPU board[1].
D01	Data Memory (RAM) failure. Error specific code shown in upper display indicates RAM chip that failed.	Replace RAM chip[2] or CPU board[1].
D04	Watchdog timer timeout.	Replace CPU board[1].

(TABLE 2 continued on next page)

NOTES:
1. If you replace the CPU board, you must reconfigure and recalibrate the Reporter. Refer to CPU board replacement under Repair for reconfiguration details. See the Calibration section for calibration procedures.
2. If you replace U55, you must reconfigure and recalibrate the Reporter. See Note 1.

TABLE 2 - Power-up self-diagnostic chart (continued)

Diagnostic Code	Malfunction	Corrective Action[5]
D05	CPU interrupt test failure.	Replace CPU board[1].
D07	Calendar program failure	Replace CPU board[1].
D10	Keyboard interrupt failure	Replace display board. Replace CPU board[1]. Replace cable that connects display board to CPU board. Replace keyboard.
D11	Invalid keyboard code	Replace keyboard. Replace CPU board[1]. Replace cable that connects display board to CPU board. Replace display board.
D12	EEPROM over-voltage detected.	Replace CPU board[1].
D13	EEPROM under-voltage detected.	Replace CPU board[1].
D14	EEPROM read failure.	Replace CPU board[1].
D15	Battery-backed RAM checksum	Replace CPU board[1].
D16	EEPROM checksum error.	Replace CPU board[1].
D17	EEPROM write failure.	Replace CPU board[1].
D20	I/O board 24 Vdc 6 supply failure.	Replace I/O board.
D21	Digital I/O test failed (Internal loop).	Replace I/O board. Replace CPU board[1]. Replace mother cable[3].
D22	Digital I/O test failed (External loop).	Replace I/O board. Replace CPU board[1]. Replace mother cable[3].
D30	CPU to A/D communication failure.	Replace CPU board[1].
D31	A/D reset failure.	Replace CPU board[1].
D32	Invalid A/D status.	Replace CPU board[1].
D33	Invalid A/D interrupt.	Replace CPU board[1]. Replace A/D board[4]. Replace cable that connects CPU and A/D board.
D34	A/D write buffer full.	Replace CPU board[1].
D35	Missing A/D interrupt.	Replace CPU board[1].
D36	Missing A/D interrupt.	Replace CPU board[1].
D37	A/D read buffer empty.	Replace CPU board[1]. Replace A/D board[4]. Replace cable that connects CPU and A/D boards.
D38	A/D transmit/receive error.	Replace CPU board[1]. Replace A/D board[4]. Replace cable that conencts CPU and A/D boards.

(TABLE 2 continued next page)

NOTES:
1. If you replace the CPU board, you must reconfigure and recalibrate the Reporter. Refer to CPU board replacement under Repair for reconfiguration details. See the Calibration section for calibration procedures.
2. If you replace U55, you must reconfigure and recalibrate the Reporter. See Note 1.
3. Cable connects CPU, digital I/O, PS/PC boards.
4. If you replace the A/D board, you must recalibrate the Reporter (see Calibration in this section).
5. Check fuses on the printed-circuit boards.

TABLE 2 - Power-up self-diagnostic chart (continued)

Diagnostic Code	Malfunction	Corrective Action
D40	A/D program memory (ROM) failure.	Replace A/D board$_4$. Replace CPU board$_1$. Replace cable that connects CPU and A/D board.
D41	A/D communication failure.	Replace A/D board$_4$. Replace CPU board$_1$. Replace cable that connects CPU and A/D board.
D43	A/D external data memory (RAM) failure.	Replace A/D board$_4$. Replace CPU board$_1$. Replace cable that connects CPU and A/D board.
D44	A/D relay or driver in *relay bank 1 failed.	Replace relay or board.
D45	A/D relay or driver in *relay bank 2 failed.	Replace relay or board.
D46	A/D relay or driver in *relay bank 3 failed.	Replace relay or board.
D47	A/D relay or driver in *relay bank 4 failed.	Replace relay or board.
D49	A/D communication failure.	Replace CPU board$_1$. Replace A/D board$_4$.

NOTES:
1. If you replace the CPU board, you must reconfigure and recalibrate the Reporter. Refer to CPU board replacement under Repair for reconfiguration details. See the Calibration section for calibration procedures.
2. If you replace U55, you must reconfigure and recalibrate the Reporter. See Note 1.
3. Mother cable connects CPU, digital I/O, PS/PC boards.
4. If you replace the A/D board, you must recalibrate the Reporter (see Calibration in this section).

*Relay bank 1 A/D board		*Relay bank 2 A/D board		*Relay bank 3 Exp. Mux. board 1		Relay bank 4 Exp. Mux. board 2	
Ch	**Relay**	**Ch**	**Relay**	**Ch**	**Relay**	**Ch**	**Relay**
1	K12	7	K10	15	K1	23	K1
2	K15	8	K5	16	K2	24	K2
3	K4	9	K6	17	K3	25	K3
4	K16	10	K1	18	K4	26	K4
5	K9	11	K11	19	K5	27	K5
6	K13	12	K7	20	K6	28	K6
		13	K2	21	K7	29	K7
		14	K3	22	K8	30	K8

Zero channel K8
RTD commoning lead K14
Ambient temperature channel K17

Self-Test Diagnostics
The SELF-TEST diagnostics is a user-initiated diagnostic routine that tests the keyboard and displays. You can initiate the Reporter to run a self-diagnostic check of these systems at any time by using the SELF-TEST procedure that follows:

Self-Test Procedure

1. Press [CONF]
2. Enter four digit security code.
3. Press [/]
4. Press [ENTER]
5. Press [SELF-TEST]

   NOTE:
   All front panel LEDs go on for 5 seconds. The word "Test" appears in the lower display.

6. Press the keys you want to check or press them all if you want to make a thorough test. Immediately after you press each key, the upper and middle display will record the row and column of the key you pressed. You can exit the SELF-TEST procedure at any time

   by pressing [SELF-TEST] (the display will will go on again).

   If the self test fails, use Table 3 to locate the problem.

Self-Diagnostic Configuration

The self-diagnostic tests which the DPR performs at power-up can be run in several different modes. The different modes provide for variations in the way test results are reported and allow the accomplishment of other special functions. A dual-inline-packaged (DIP) switch assembly with eight switches, located on the CPU printed circuit board (Figure 11), controls the self-diagnostic modes. All eight switches are in the "off" position when the Reporter is shipped from the factory. To configure the self-diagnostics, refer to Table 4 and select the self-test modes in which you want the Reporter to run. Then place the switch in the "on" or "off" position as indicated in the table.

TABLE 3 - Self-Test Diagnostics

Symptom	Corrective Action
Numeric display fails to light	Replace display. Replace display printed circuit board. Replace CPU board[1]. Replace cable connecting CPU and display board.
LED fails to light	Replace display printed circuit board. Replace CPU board [1]. Replace cable connecting CPU and display printed circuit board.
Key fails to operate	Replace keyboard assembly. Replace display printed circuit board. Replace CPU board[1]. Replace cable that connects display printed circuit board and CPU board.

NOTE:
1. If you replace the CPU board, you must reconfigure and recalibrate the Reporter. Refer to CPU board replacement under Repair for reconfiguration details. See the Calibration section for calibration procedures.

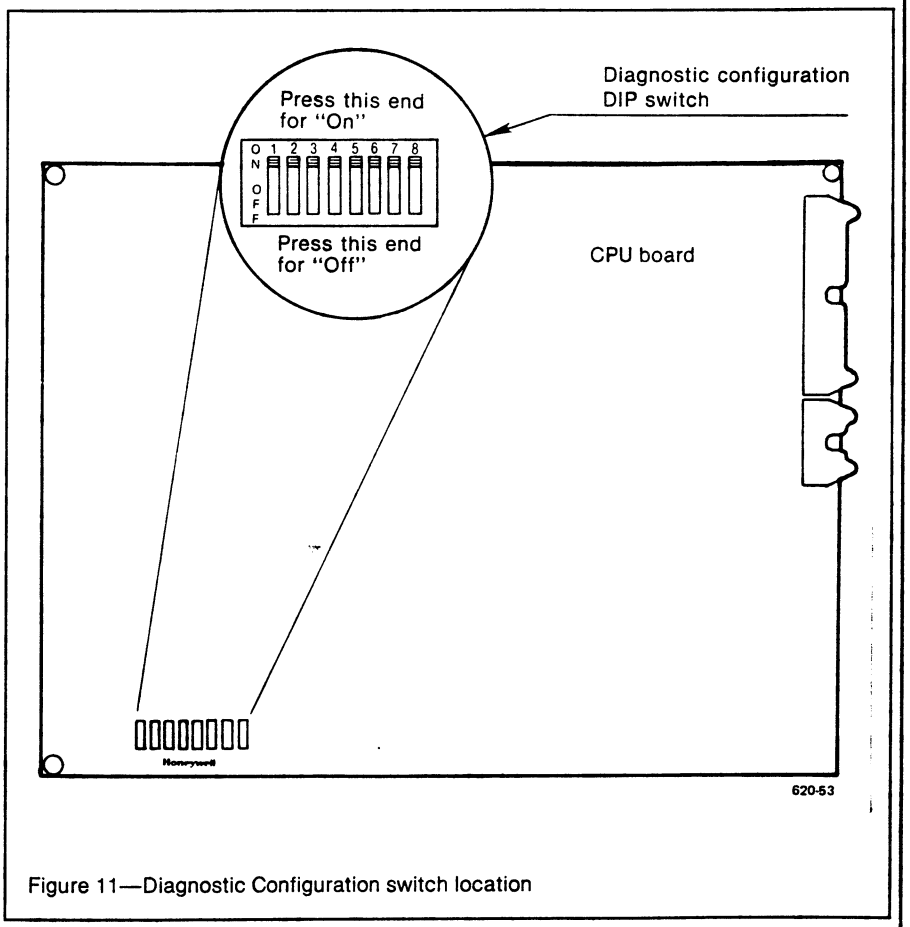


Figure 11—Diagnostic Configuration switch location

TABLE 4 - Diagnostic Configuration

Modes of Operation	DIP Switch	Switch Position
Enter key on front panel is enabled.	S1	"Off"
Enter key on Front panel is disabled.	S1	"On"
Power-up message is printed one time.	S2	"Off"
Power-up message and scan reference sensor alignment marks are continuously printed.	S2	"On"
Switch should always be set to "Off".	S3	"Off"
Failed test causes power-up diagnostic routine to pause and the error code to be displayed for 5 seconds. After 5 seconds, the error code is extinguished and the diagnostic routine resumes.	S4	"Off"
Failed test causes diagnostic routine to stop and Reporter operation to be disabled.	S4	"On"
Switch should always be set to "Off".	S5	"Off"
After "power up," DPR enters mode it was previously in.	S6	"Off"
After "power up," DPR enters the configuration mode.	S6	"On"
Normal Position.	S7	"Off"
Functional configuration, security code change, and calibration.	S7	"On"
Switch S8 has factory application only. Position of switch has no effect on diagnostic operation.	S8	

Determining Self-Diagnostic Configuration

During the diagnostic routine run at power-up, the LEDs display the status of the diagnostic DIP switches. The upper display shows the status of DIP switches 1 through 4 and the lower display shows the status of DIP switches 4 through 8 (Figure 12). A lit LED means the DIP switch is in the "On" position.

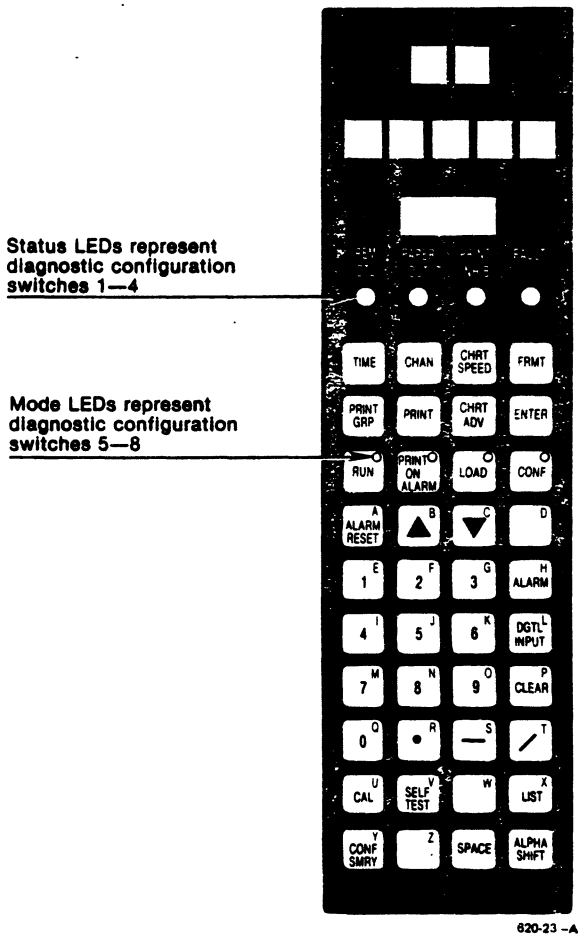


Figure 12—DIP switch configuration display

Fuse Data

Check fuses for continuity. An open fuse should be replaced with a new fuse of the same rating. A fuse replacement kit is available, part #30753447-001. It includes one of each fuse listed here.

TABLE 5 - PS/PC board fuses (see Figure 13)

Fuse	Protects	Size
F1	Color Change Clutch	1.5A
F2	Chart Drive Motor	.25A
F3	Scan Motor	.75A
F4	Print Head (Pin 7)	1A
F5	Print Head (Pin 8)	1A
F6	Print Head (Pin 9)	1A
F7	Print Head (Pin 1)	1A
F8	Print Head (Pin 2)	1A
F9	Print Head (Pin 3)	1A
F10	Print Head (Pin 4)	1A
F11	Print Head (Pin 5)	1A
F12	Print Head (Pin 6)	1A
F13	Unregulated +5 Vdc	5A
F14	Regulated +5 Vdc	5A

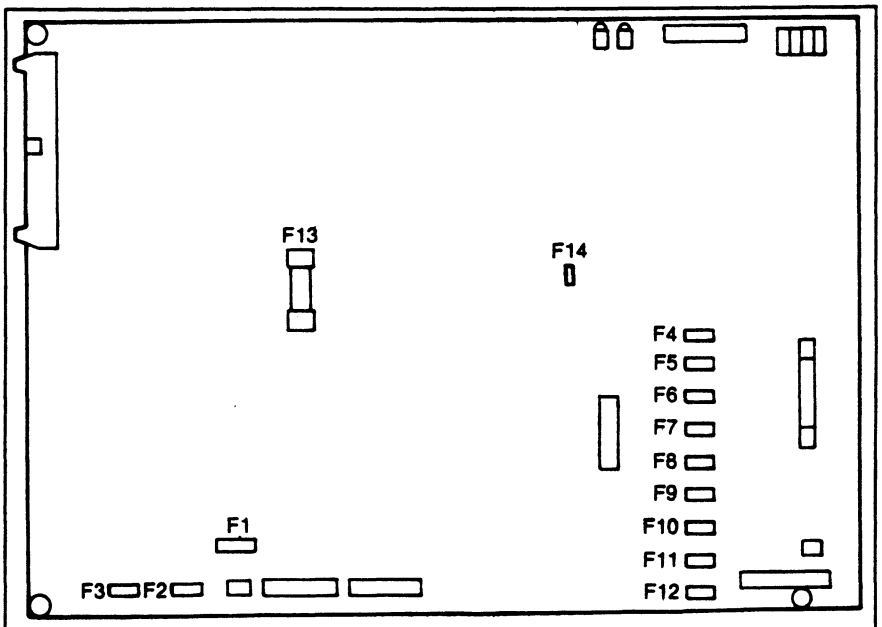


Figure 13—Power supply/print control fuse location 620-64

Line fuse (see Figure 14)

Power	Main Protection	See note

NOTE: Line fuse is 7A slow blow for 100 and 120 Vac configurations and 4.0A slow blow for all other configurations.

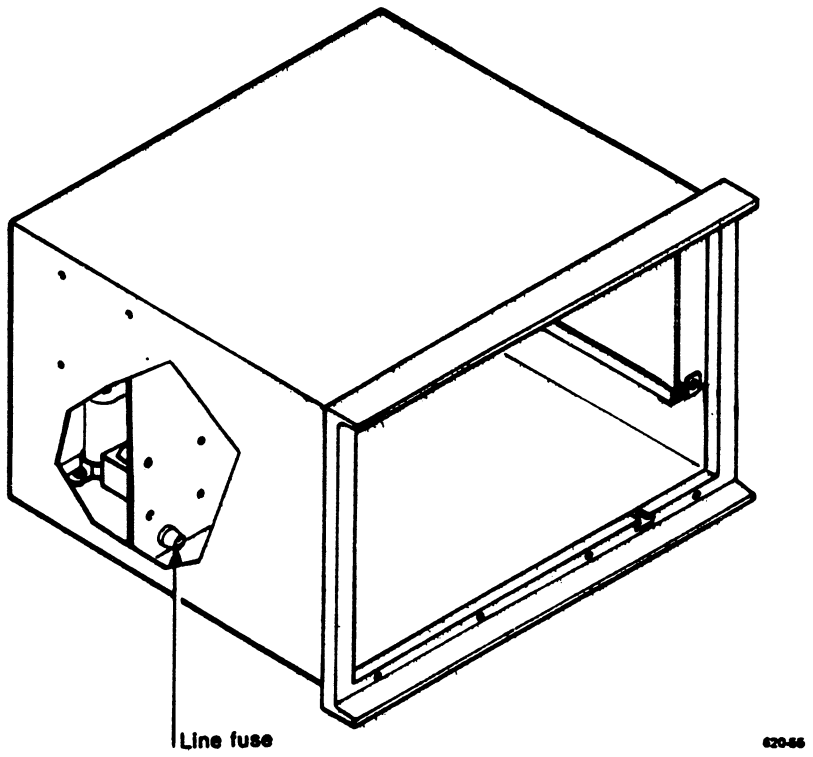


Figure 14—Line fuse location

A/D board fuses (see Figure 15)

F1	+ 5 Volt Supply	1.5A
F2	− 4.3 and − 12 Volt Supply	3.0A
F3	+ 12 Volt Supply	3.0A

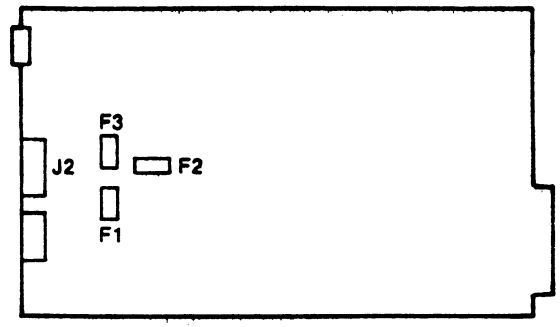


Figure 15—A/D board fuse location

Test and Adjustments—Electronic Subsystem

Output Relay Test (Part #62795413-002)

1. Remove the output relay.
2. Use an ohmmeter to make the following measurements on the relay.

Measure between pins	Reading
1 and 4	630-770 ohms
5 and 6	Less than 1/2 ohm
6 and 7	Greater than 10 megohms
8 and 9	Less than 1/2 ohm
9 and 10	Greater than 10 megohms

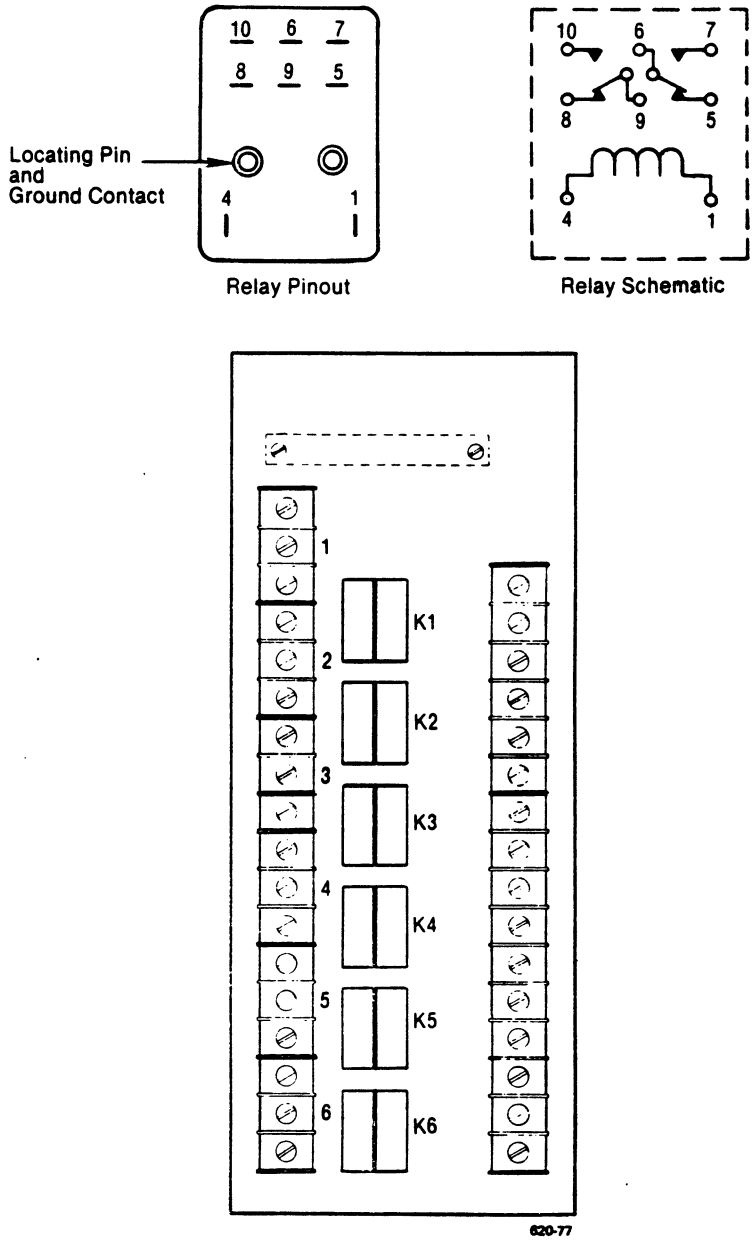
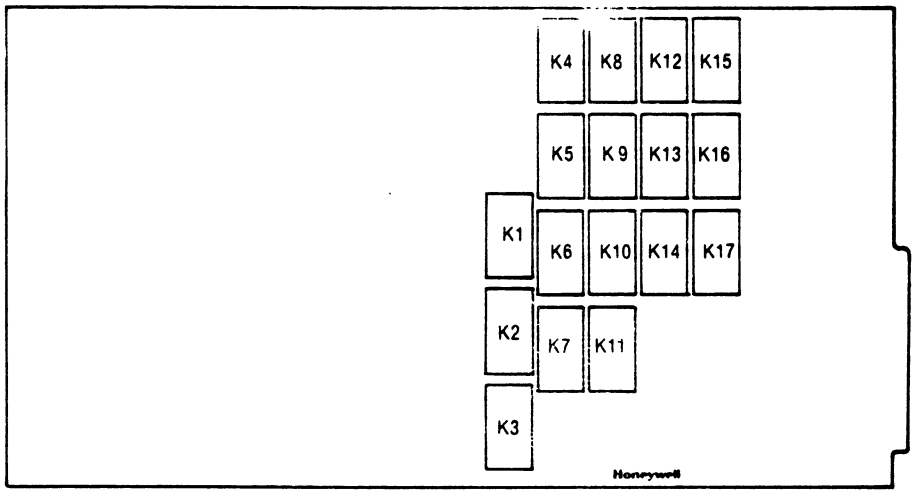


Figure 16—Output relay board

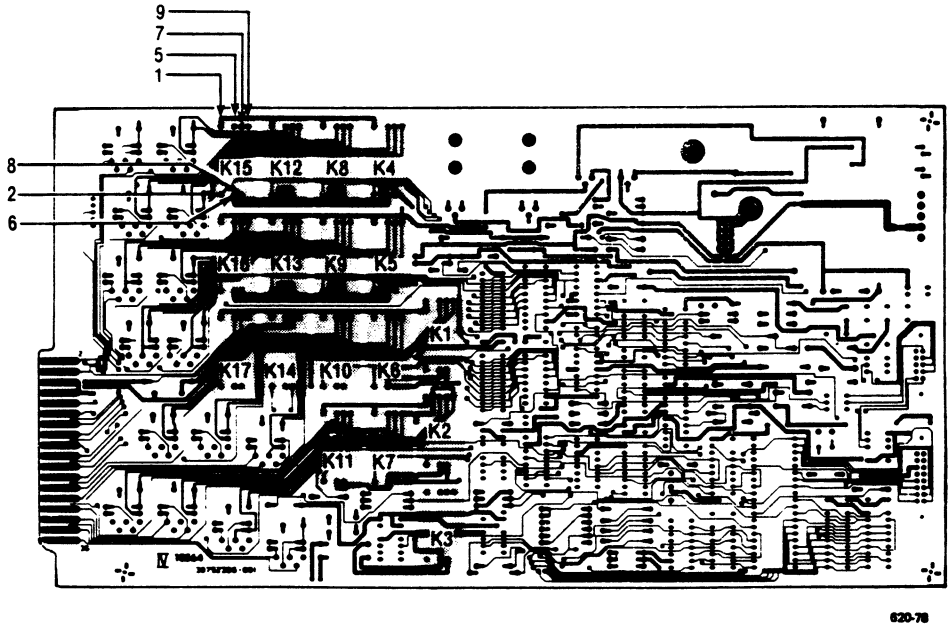
A/D Relay Test (Part Number 30754042-401)

1. Unplug connectors from A/D board.
2. Remove A/D board.
3. Use an ohmmeter to make the following measurements on the circuit board.

Measure between pins	Reading
1–2	1900–2000 ohms
5–6	Greater than 10 megohms
7–8	Greater than 10 megohms



A/D board -- component side



A/D board -- soldered side

Figure 17—A/D board

Ambient-Temperature-Compensation RTD Test

1. Turn off power to Reporter.
2. Remove back cover.
3. Disconnect wires connected to terminals 4 and 6 on TB1 by loosening screws.
4. Connect an ohmmeter across the free ends of wires to measure the compensation RTD's resistance.
5. Measure the ambient temperature at TB1 with a thermometer.
6. Determine if the resistance you measure in step 4 corresponds with the temperature you measured in step 5 according to Table 6. Use the formula 1°F. = .214 ohms to extrapolate when the temperature you measure is not in the table.
7. Replace the ambient temperature compensation RTD if the resistance you measure varies more than ±3 ohms from the resistance listed in Table 6.

TABLE 6 - Temperature-resistance equivalencies

50°F. = 103.9 ohms	110°F. = 116.83 ohms
55°F. = 104.98 ohms	115°F. = 117.90 ohms
60°F. = 106.07 ohms	120°F. = 118.97 ohms
65°F. = 107.15 ohms	125°F. = 120.04 ohms
70°F. = 108.22 ohms	130°F. = 121.11 ohms
75°F. = 109.30 ohms	135°F. = 122.17 ohms
80°F. = 110.38 ohms	140°F. = 123.24 ohms
85°F. = 111.46 ohms	145°F. = 124.31 ohms
90°F. = 112.53 ohms	150°F. = 125.37 ohms
95°F. = 113.61 ohms	155°F. = 126.43 ohms
100°F. = 114.68 ohms	160°F. = 127.50 ohms
105°F. = 115.75 ohms	

Troubleshooting—Electromechanical Subsystem

The electromechanical subsystem includes the chart and scan motor drive train and associated belts, gears, pulleys, switches, and sensors. Faults in the electromechanical subsystem can be diagnosed through the auxiliary troubleshooting chart. The auxiliary troubleshooting chart also lists symptoms and possible causes of problems that may not be detected by the Reporter's three electronic self-diagnostic systems.

Under each symptom one or more possible causes are listed and alongside of each possible cause a test or corrective procedure is indicated. In general, test procedures will usually reference you to the test/adjustment section of the Service section and the corrective procedures to the Repair section.

For a given symptom, investigate the possible causes one at a time in the order given. In some cases replacement of electronic boards is indicated as a corrective action for an electromechanical fault because it is possible for an electronic failure to go undetected by the self-diagnostic systems. Nevertheless, before using the auxiliary troubleshooting chart, make sure the three self-diagnostic systems for diagnosing problems in Reporter electronics do not indicate any circuit failures.

Auxiliary Troubleshooting Chart

1. Symptom: REPORTER IS TOTALLY INOPERATIVE.	
Possible cause	***Test/Corrective Procedure***
Loss of line input.	Determine if power is being supplied to Reporter.
Blown line fuse.	Replace line fuse (page 14).
2. Symptom: CHART MOTOR WILL NOT RUN	
Possible cause	***Test/Corrective Procedure***
Chart motor fuse blown.	Replace fuse (page 13).
Chart paper installed incorrectly.	Install correctly (see Installation section).
Chart paper torn.	Advance chart beyond torn section.
Chart paper at end of roll.	Install new chart roll.
Paper-out switch failure.	Test switch (page 19).
Chart motor failure.	Test motor (page 21).
Power supply failure.	Replace PS/PC board (page 36).
Logic failure.	Replace CPU board (page 34).
Mechanical binding or slipping in chart drive train.	Free binding or eliminate slipping (page 21).

3. Symptom: PRINT HEAD WILL NOT SCAN ACROSS THE CHART

Possible cause	*Test/Corrective Procedure*
Blown scan drive fuse.	Replace fuse (page 13).
Scan motor binding.	Test scan motor for binding (page 23).
Binding or slipping in scan drive train.	Free binding or eliminate slipping (page 22).
Inkwheel belt tension.	Adjust inkwheel belt tension (page 23).
Scan motor electrical failure.	Test motor electrically (page 23).
Clutch slippage (six-color models).	Test clutch (page 22).
Power supply failure.	Replace PS/PC board (page 36).
Logic failure.	Replace CPU board (page 34).

4. Symptom: PRINT HEAD SCAN ERRATIC OR ABNORMAL

Possible cause	*Test/Corrective Procedure*
Reference sensor failure.	Test sensor (page 27).
Inkwheel belt tension misadjusted.	Adjust inkwheel belt tension (page 23).
Scan motor drive shaft end-play out of tolerance.	Adjust to tolerance (see clutch test, page 22).
Power supply failure.	Replace PS/PC board (page 36).
Logic failure.	Replace CPU board (page 34).

5. Symptom: REPORTER PRINTS OUTSIDE OF NORMAL PRINT AREA

Possible cause	*Test/Corrective Procedure*
Reference sensor "flag" misadjusted.	Adjust reference sensor "flag" (page 27).

6. Symptom: REPORTER DOES NOT PRINT THE CORRECT COLOR

Possible cause	*Test/Corrective Procedure*
Color change clutch fuse blown.	Replace color change fuse (page 13).
Mechanical binding in scan motor drive train.	Free binding (page 22).
Logic failure.	Replace CPU board (page 34).
Power supply failure.	Replace PS/PC board (page 36).

7. Symptom: SEGMENTS OF PRINTED CHARACTERS MISSING OR CHARACTERS ILLEGIBLE

Possible cause	*Test/Corrective Procedure*
Print head pin fuse blown.	Replace fuse(s) (page 13).
Print head electrical failure.	Test printhead (page 24).

8. Symptom: PRINT HEAD TEARS PAPER WHEN PRINTING

Possible cause	*Test/Corrective Procedure*
Print head gap too wide.	Adjust printhead gap to within tolerance (page 26).

9. Symptom: REPORTER WILL NOT VERIFY CALIBRATION

Possible cause	*Test/Corrective Procedure*
Ambient temperature RTD failure.	Test ambient temperature RTD (page 17).

10. Symptom: DISPLAY AND CHART VALUE DRIFT ON A PARTICULAR CHANNEL (this symptom pertains to Reporters not equipped with burnout input indication)

Possible cause	*Test/Corrective Procedure*
Open input.	Repair input leads or replace sensor.

11. Symptom: FAN INOPERATIVE

Possible cause	*Test/Corrective Procedure*
Fan motor failure.	Test fan.
Fan voltage dropping resistor (50 ohm 25W) open.	Test resistor (see Figure 3, page 4).

Tests and Adjustments—Electromechanical Subsystem

Paper-out switch test (Figure 19)

The paper-out switch is located on the right tractor. The switch has a spring controlled lever that is depressed when paper is installed in the tractor and the tractor door is closed. With the lever depressed, the switch contacts are open.

Each chart paper roll has a rectangular cutout on the right side of the paper near the end of the roll. When this cutout moves over the right tractor, the spring controlled lever moves outward allowing the switch contacts to close. If the Reporter tries to print while it senses the paper-out switch contacts closed, it automatically shifts into the load mode (which prohibits the Reporter from printing) and turns on the paper-out LED.

1. Advance the chart so that a perforation is at the top of the platen as shown in Figure 19. Tear the chart at the perforation.
2. Turn the take up roll to allow you access to the paper-out switch terminals which are behind the right tractor. Lift both tractor covers and remove the chart paper from tractors.
3. Disconnect connector J5 on PS/PC board.
4. Connect ohmmeter leads across the two wired terminals of the paper-out switch.
5. Measure the resistance across the paper-out switch. The resistance should be less than ten ohms.
6. With the ohmmeter still connected across the paper-out switch, press the paper-out switch lever in. The resistance should go to greater than one megohm.
7. If the measurements in either steps five or six are out of tolerance, replace the tractor pair.
8. If the measurements in steps five and six are correct, replace the paper (from the supply roll) in the tractors and close the tractor doors.
9. Measure the resistance across the switch contacts with paper in the tractor. It should be greater than one megohm (the same reading you got in step six). If it isn't, try to adjust the switch:

Paper-out switch adjustment

10. Remove the paper from the tractors. Pull the paper-out switch lever out. (What you're trying to do is readjust the spring tension so that when paper is in the tractor and the tractor door is closed, the switch contacts are open.)
11. Measure the resistance of the switch with its lever extended. It should be less than 10 ohms.
12. Now reinstall paper in the tractors and measure the resistance across the paper-out switch terminals again. The resistance should read greater than one megohm. If the adjustment didn't work, (you should do step 10 at least twice) replace the tractor pair.
13. Reconnect J5 on the PS/PC board and tape two ends of chart paper together.

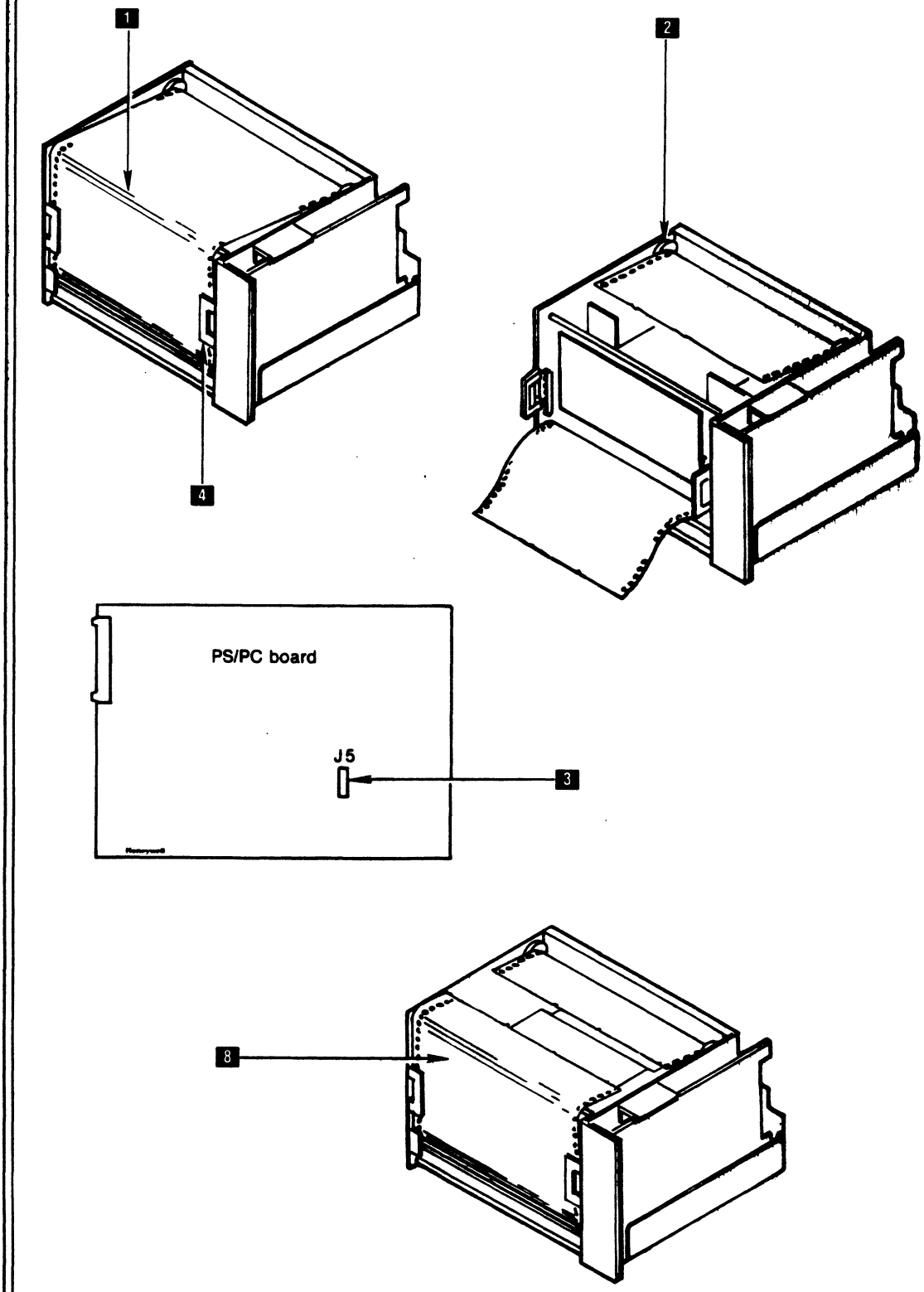


Figure 19—Paper out tests

Chart motor test (Figure 20)

1. Remove I/O board (refer to page 36 for removal directions).
2. Unplug connector J3 from PS/PC board.
3. Jumper terminals 1 through 4 of J3's plug and connect ohmmeter across terminals as listed below to test resistance of motor windings.
4. Replace chart motor if resistance readings are out of tolerance (refer to removal procedure under Repair).

Chart Drive Train Tests and Adjustments (Figure 21)

Testing for binding or slipping in gears

1. Remove CPU board (refer to page 34 for reomval procedure).
2. Turn the chart motor pinion gear manually and observe if the chart motor pinion gear and the larger gear are meshing without binding.
3. Also observe whether the pinion gear and the larger gear are aligned properly.

Correcting binding and slipping in gears (Figure 21)

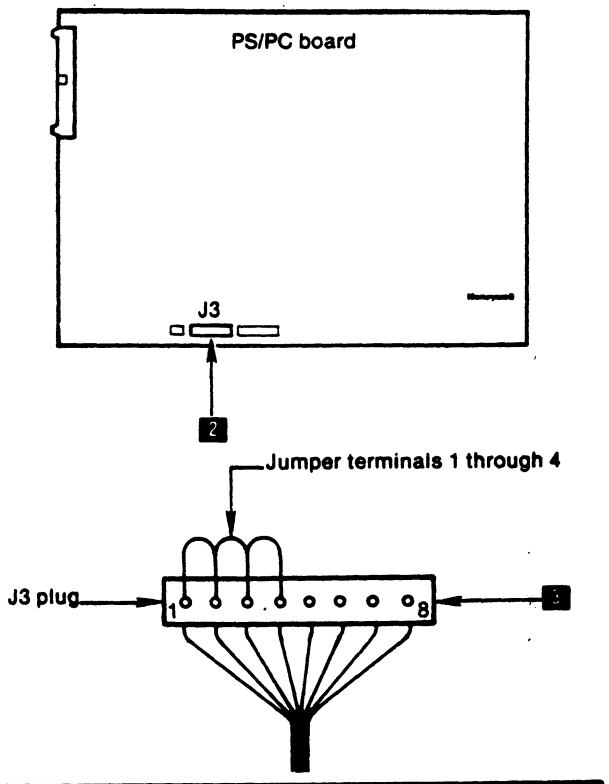
4. To adjust the mesh between the pinion gear and the larger gear, loosen the four screws that attach the chart motor to the right side plate. Reposition the motor as necessary. Retighten four screws.
5. To realign the pinion and larger gear, loosen the two bristol screws on the pinion and slide pinion in or out as necessary to correctly align pinion with the larger gear. Retighten bristol screws.

Testing belt tension (Figure 21)

6. Check the tensions of the following belts
   - Takeup-supply
   - Takeup!gear
   - Tractor-gear

Belt adjustment (Figure 21)

7. To adjust belt tension, loosen the belt guide screw and reposition belt guide for proper tension. Retighten belt guide screw.



On J3 Read between Terminals	Resistance between
1-5	37.4 and 57.4 ohms
1-6	37.4 and 57.4 ohms
1-7	37.4 and 57.4 ohms
1-8	37.4 and 57.4 ohms

620-82-A

Figure 20—Chart motor tests

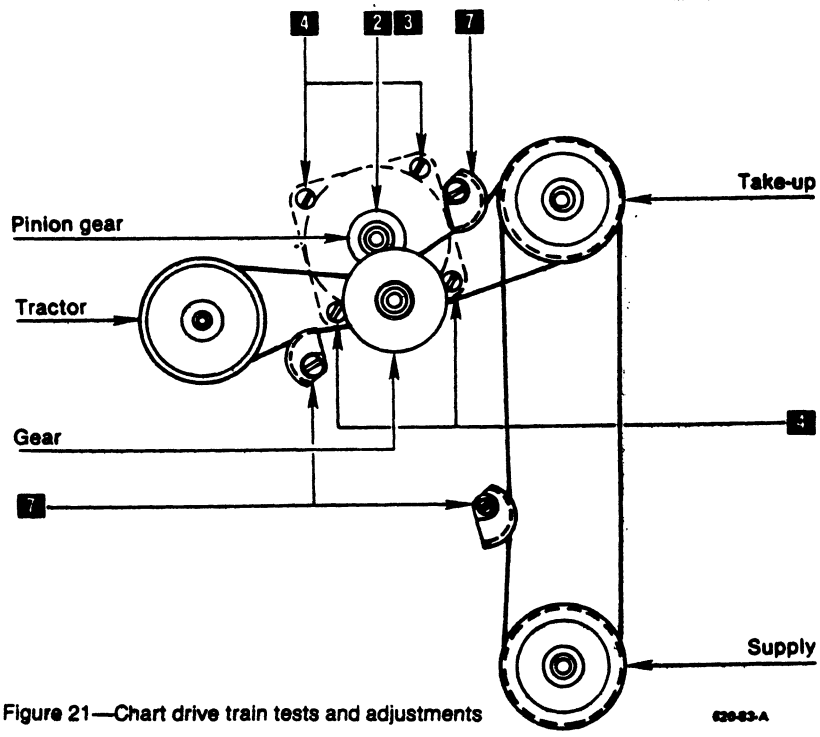


Figure 21—Chart drive train tests and adjustments

620-83-A

Testing for Mechanical Binding or Slipping in Scan Motor Drive Train (Figure 22)

1. Turn off power to the Reporter.
2. Move the printhead and inkwheel carriage up and down the chart to check for binding. Do this by turning the scan motor pinion.
3. Check the position of the scan motor pulley. It should not be touching the top plate of the motor. If it is, adjust the pulley by loosening the pulley's two set screws.
4. Check the 47 groove pulley which is located on the top of the clutch shaft. This pulley should be located in the same plane as the scan motor pulley. Also the belt between these two pulleys must not be cocked.
5. Check the scan motor belt. If an adjustment is necessary, move the scan motor closer to or further from the clutch mechanism.

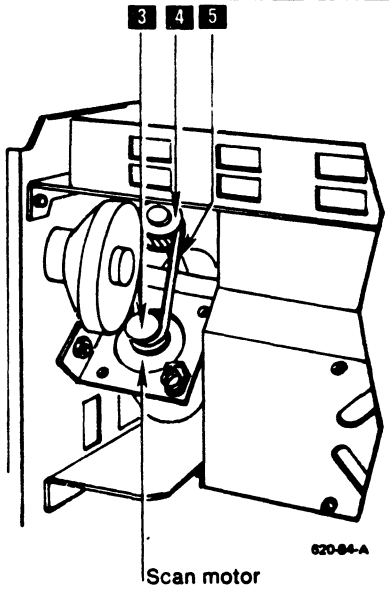


Figure 22—Scan motor adjustments

Clutch Test

1. Remove clutch lock plate (Figure 23) and verify that the main clutch body rotates freely. If the body doesn't rotate freely, replace clutch mechanism. Reinstall clutch lock plate so that it restricts clutch main body from complete rotation. Note: Some rotational play in clutch main body with clutch lock plate on is required for correct operation.
2. Check drive shaft end-play (Figure 24). Collar on clutch shaft must be adjusted so that clutch has .002 to .005 inches of shaft end play.

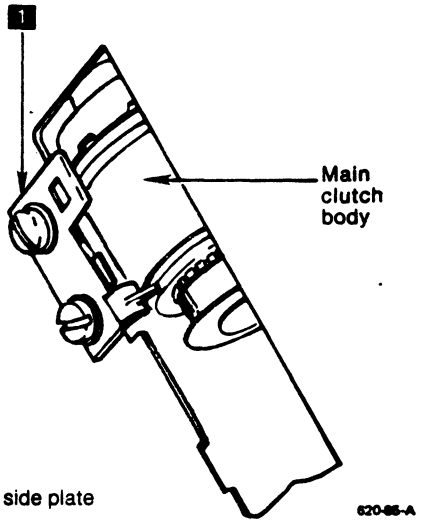


Figure 23—Left side plate

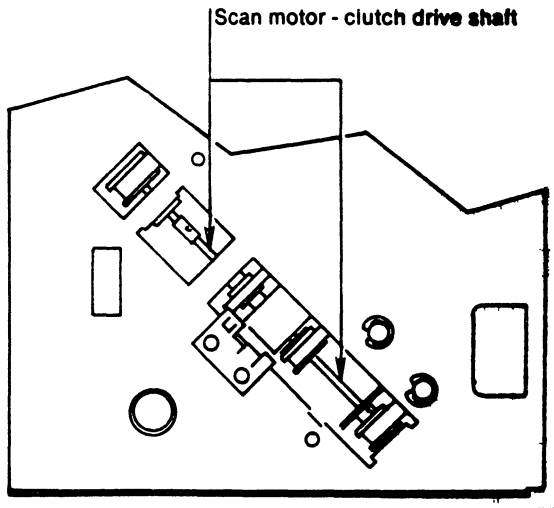


Figure 24

Testing Inkwheel Belt Tension

1. Check inkwheel belt tension (Figure 25).
2. If adjustment is necessary, readjust pulley on right side plate.

Scan Motor Binding Test (Figure 26)

1. Release the two screws on scan motor that maintain scan motor belt tension. Remove the scan belt from motor pinion pulley. If scan pinion is still binding, replace motor.
2. If the scan pulley does not bind when the belt is removed from the pinion, reinstall the belt and adjust the belt deflection.

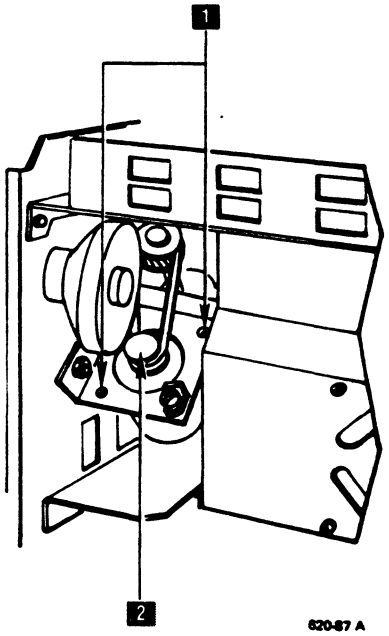


Figure 26—Scan motor binding test

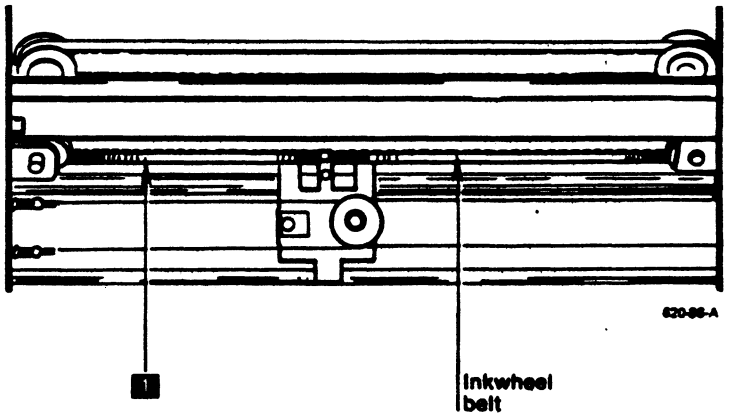


Figure 25—Inkwheel belt

Scan Motor Electrical Test (Figure 27)

1. Disconnect connector plug J4 from PS/PC board.
2. Jumper pins 1, 2, 3, and 4 together on J4's plug.
3. Make the measurements on J4's plug listed below.

Measure between pins	Resistance should read between
1-5	4-6 ohms
1-6	4-6 ohms
1-7	4-6 ohms
1-8	4-6 ohms

Replace the motor if any of the resistances you measure differ from those given.

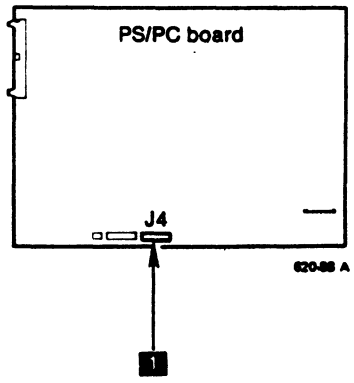


Figure 27—Scan motor electrical test

Overrun Switch Test (Figures 28, 29, 30)

1. Turn off power to the Reporter.
2. Remove the CPU board.
3. Disconnect J5 on the PS/PC board.
4. Connect an ohmmeter across the two wired terminals of the overrun switch.

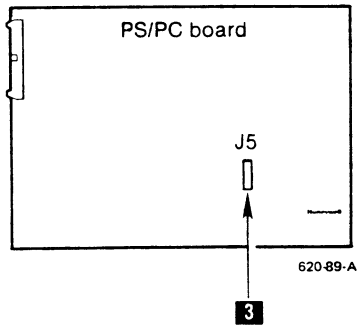


Figure 28—Overrun switch test

5. Turn the scan motor pinion to move the printhead belt to a point where the belt bump is not activating the overrun switch. The ohmmeter should read greater than 1 megohm. If this reading is not correct, replace the sensor cable (includes the overrun switch).
6. Turn the scan motor pinion to move the printhead belt to a position where either belt bump is activating the overrun switch. The ohmmeter should read less than 10 ohms.

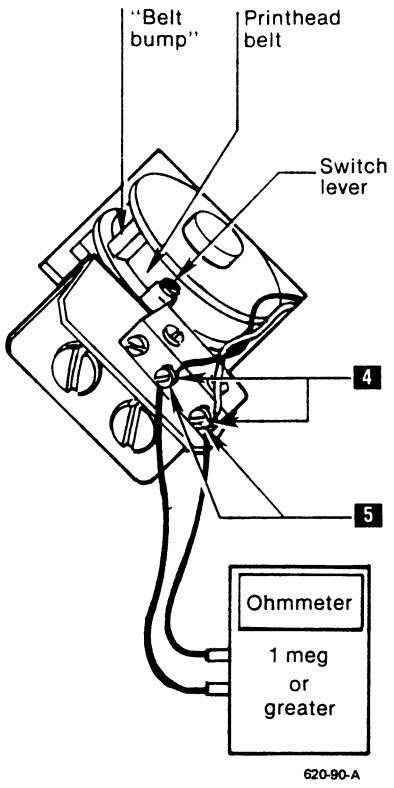


Figure 29—Overrun switch test

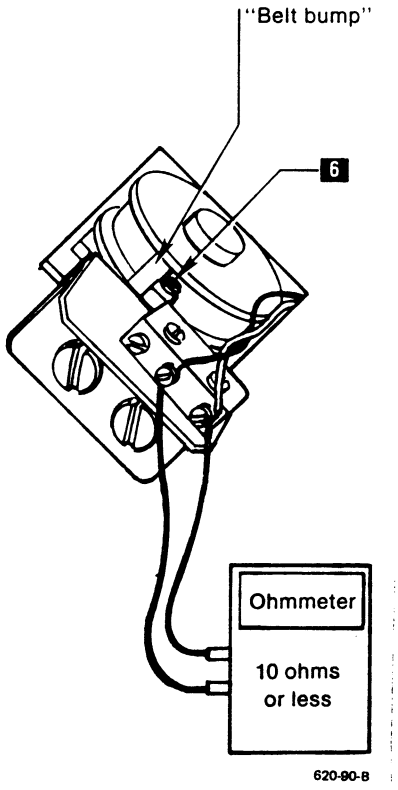


Figure 30—Overrun switch test

Overrun Switch Adjustment

1. Loosen the two overrun switch mounting screws.
2. a. If the switch resistance measures less than ten ohms without the belt bump activating the scan switch, move the switch furthur away from the right side plate. If moving the switch does not increase the resistance to greater than one megohm, replace the sensor cable.

   b. If the switch resistance measures greater than one megohm with the belt bump activating the switch, move the switch closer to the right side plate. If this doesn't work, go on to step 3.
3. Free the inkwheel and printhead belts from their carriages. Make sure scan switch is as close to right side plate as possible while maintaining a resistance greater than 1 megohm with the belt bump not activating the scan switch.
4. Move the belt bump upscale until the belt bump activates the switch. If the resistance is more than 10 ohms, replace the scan switch.

Electrical Check of Printhead (Figure 31)

1. Disconnect J7 from PS/PC board.
2. Measure the resistance between pins of J7's receptacle according to the following table. If any pin measurements are not within these limits, replace the printhead (see Printhead replacement procedure).

TABLE 7

Measure between pins	Resistance should be between
2-10	2.4 and 3.4 ohms
3-9	2.4 and 3.4 ohms
4-21	2.4 and 3.4 ohms
5-22	2.4 and 3.4 ohms
6-23	2.4 and 3.4 ohms
7-11	2.4 and 3.4 ohms
8-14	2.4 and 3.4 ohms
15-18	2.4 and 3.4 ohms
19-20	2.4 and 3.4 ohms

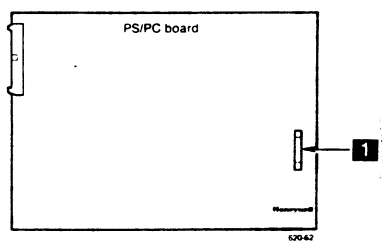


Figure 31—Printhead electrical test

Testing Alignment of Printhead to Color Wheel (Figure 32)

1.. Turn off power to the Reporter.

2. Move the printhead to the center point of its travel (50% chart position) by turning the scan motor pinion.

3 Manually adjust the clutch mechanism to select the third color wheel. To do this, pull down on the black tooth mold, and at the same time, turn the scan motor pinion until the black tooth is positioned below the third color wheel slot. Release the black tooth mold.

4 Check that the pins on the printhead are aligned in the center of the third inkwheel. If pins are aligned incorrectly, realign (see realigning color wheel and printhead).

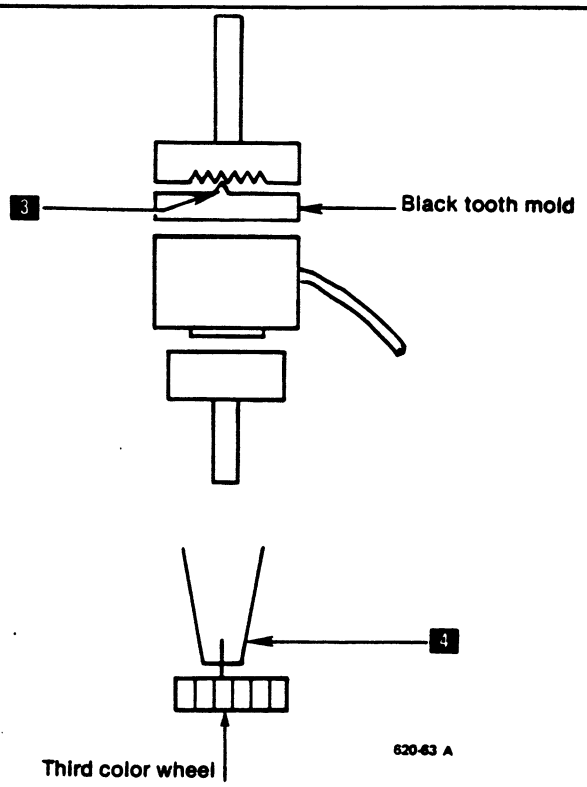


Figure 32—Testing alignment of printhead to color wheel

Realigning Color Wheel and Printhead (Figures 32 and 33)

1 Remove power and withdraw the chassis to the maintenance stop.
2. Remove a section of the chart between the supply and reroll.
3. Do steps 2 and 3 in Testing Alignment of Printhead to Color Wheel (Figure 32).
4. Loosen the two size 6, bristol set screws holding the lower pulley (Figure 33) on the clutch drive shaft.
5. NOTE: During this adjustment, a magnifying glass will make it easier to see the printhead-color wheel relationship.
   Turn the scan motor output pinion to position the printhead so that the impact pins are centered on the third color wheel. Holding the ink wheel carriage in position, tighten the available set screw on the lower pulley on the clutch drive shaft. Rotate the pulley and tighten the other set screw.
6. Recheck the printhead-color wheel alignment and repeat steps 4 and 5 as necessary to ensure the impact pins are centered on the third color wheel.
7. Replace the chart and the power.

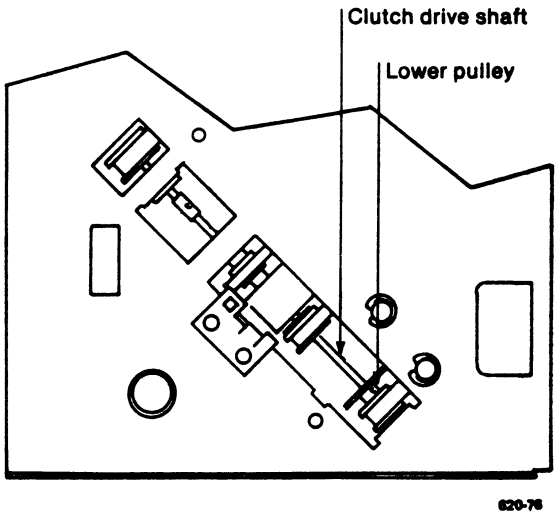


Figure 33—Realigning color wheel and printhead

Printhead Gap Test (Figure 34)

1. Turn off the power to the Reporter.
2. Remove the chart paper from between inkwheel and printhead.
3. Move the printhead to the center point of its travel by manually turning the scan motor pinion.
4. Insert the feeler gauge between printhead and inkwheel to measure the gap; the gap should be between .028 and .035 inches. If it is not, readjust.

NOTE: Proper adjustment of printhead gap is important. If gap is too narrow, printwheel life is decreased. If gap is too wide, printhead pins may puncture paper.

Printhead Gap Readjustment

5. Loosen printhead screws.
6. Move the printhead closer to or furthur from the inkwheel as may be necessary.
7. Measure the printhead gap.
8. Retighten printhead.

Printhead Gap Parallelity Test (Figure 35)

1. Turn off power to the Reporter.
2. Measure the printhead gap with the printhead at the 0% chart line. Then measure the printhead gap with the printhead at the 100% chart line. Move the printhead by manually turning the scan motor pinion.

   The difference in the gap when the printhead is at the 0% chart line and the 100% chart line should be no greater than .005 inches. If the difference exceeds the tolerance, adjust printhead gap parallelity (see the following section).

Printhead Gap Parallelity Adjustment (Figure 36)

1. Remove CPU board.
2. Readjust the back carriage rod by loosening the back carriage rod screw on the right side plate until the gap difference at the 0% and 100% chart positions is within .005 inches.

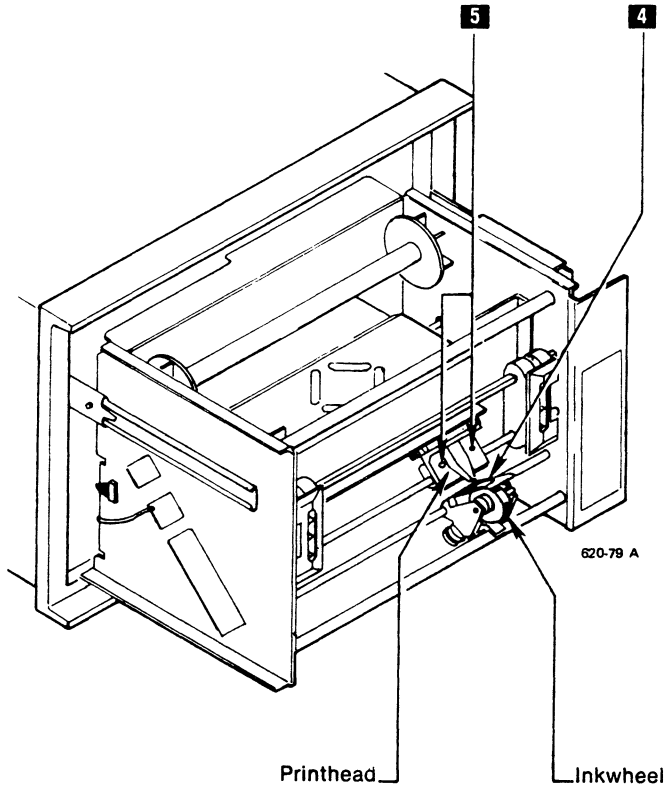


Figure 34—Printgap test and adjustment

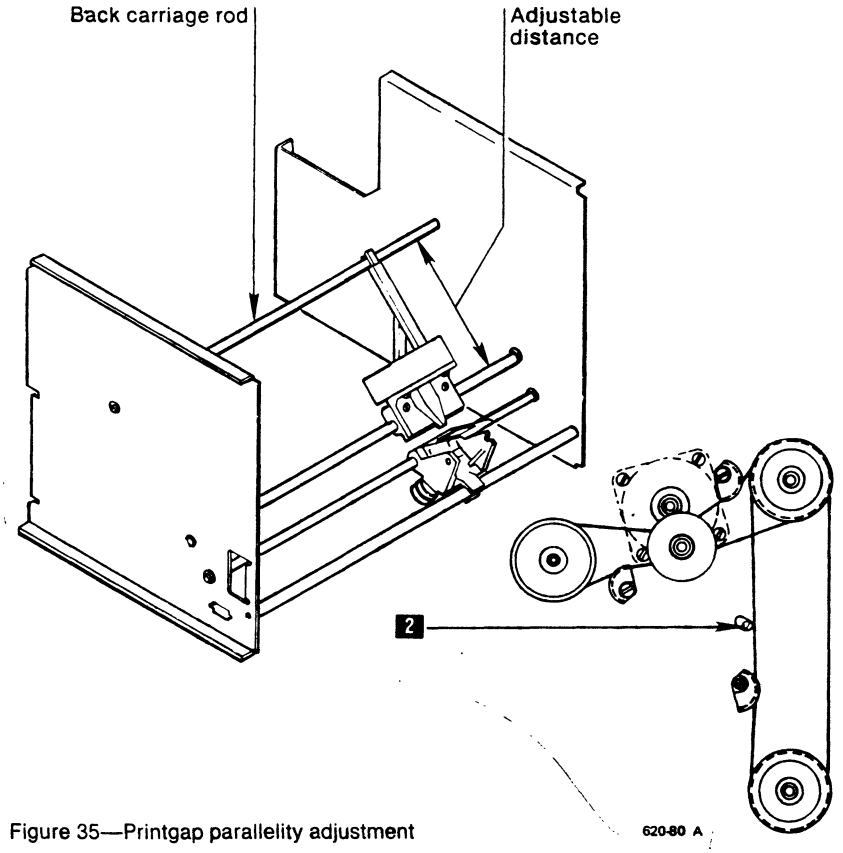


Figure 35—Printgap parallelity adjustment

Span Reference Sensor Test and Adjustment Procedure

Equipment required:

1. A voltage source capable of producing one of the test voltages in Table A with an accuracy of plus or minus 0.01%.

TABLE A — Test Voltages

Test Voltage	Test Range Lower	Voltage Limits Upper	Test Voltage Code
18 mv	0	20 mv	1
45 mv	0	50 mv	2
90 mv	0	100 mv	3
9 V	0	10 V	4

2. Two insulated wires (30 to 12 gage)
3. A small-bladed screwdriver.

Procedure:

1. Apply power to the Reporter.
2. Use the following key sequence to run a configuration summary.

   [CONF]

   Security Code

   [/]

   [ENTER]

   [CONF SUMRY]

   [ENTER]

3. CAUTION: POWER IS APPLIED TO THE REPORTER POWER TERMINALS DURING THIS STEP AND STEP 4.

- If an unused channel is available, connect the voltage source to its input terminals; then go to step 5.
- If an unused channel is not available, go to step 4.

4. Disconnect the input wiring from the terminals for Channel 1; then connect the voltage source to these terminals.
5. Configure the channel number to which you connected the voltage source, using (from Table A) the range limits and code for the selected test voltage in the following key sequence;

   [CHAN]

   Channel number

   [/]

   Channel number

   [/]

   [0]

   [/]

   Code for test voltage (From Table A)

   [/]

   [0]

   [/]

   [1]

   [/]

   [/]

   [/]

   Upper limit for test voltage (From Table A)

   [/]

   [0]

   [/]

   [/]

   [ENTER]

6. Using the following key sequence, configure Chart Speed 1 to the maximum speed in the units previously selected for your DPR (see the configuration summary)—either 100 inches per hour or 264 centimeters per hour.

   [CHRT SPEED]

   [1]

   [/]

   Maximum speed

   [/]

   [/]

   [/]

   [ENTER]

7. Configure Print Group 1 with the channel number configured in Step 5 as the only channel number.

   [PRINT GROUP]

   [1]

   [/]

   Channel number

   [/]

   Channel number

   [1]

   [/]

   [ENTER]

8. Use the following key sequence to configure the chart range 1 to the range for the test voltage you selected from Table A.

FRMT

1

/

1

/

/

0

/

Upper limit for test voltage (From Table A)

/

/

ENTER

9. Set the voltage source to the test voltage selected from Table A.

10. Make sure the RUN and LOAD indicators are lit. If they are not, press

LOAD and RUN

11. Use the following key sequence to select the TREND print format.

FRMT

1

ENTER

12. Use the following key sequence to select Print Group 1.

PRINT GRP

1

ENTER

13. Use the following key sequence to select the high chart speed.

CHRT SPEED

1

ENTER

14. If the LOAD indicator is lit, press

LOAD ; then observe that the center of the trend line is at the 90% chart line within plus or minus one dot diameter.

(continued on page 29)

15. If the trend line is within the tolerance, go to Step 23.

    If the trend line is not within the tolerance, go to Step 16.

16. Remove power from the Reporter.

17. Pull down the platen.

18. Use the scan motor pinion to move the printhead to the left side of the chart.

19. Locate the reference sensor "flag" (Figure 36); then loosen the attaching screw one-quarter turn.

20. NOTE: In this step, one full turn of screw equals approximately 0.025 inch (0.62 mm) adjustment.

    Insert a screwdriver through the left side plate and engage the adjusting screw. Turn screw counterclockwise to move flag to the left or clockwise to move the flag to the right (see Figure 37).

21. Tighten the attaching screw.

22. If the LOAD indicator is lit, press

    LOAD ; then observe the position

    position of the trend line.

    Repeat Steps 15 through 22 until the trend line is within plus or minus one dot diameter of the 90% chart line.

23. CAUTION: POWER IS APPLIED TO THE REPORTER DURING THIS STEP. Disconnect the voltage source and, if necessary, reconnect the input wiring to the terminals for the channel used during the test.

24. Reconfigure the Channel Number, Chart Range 1, Chart Speed 1 and Print Group 1 to the data in the configuration summary you ran before using this procedure.

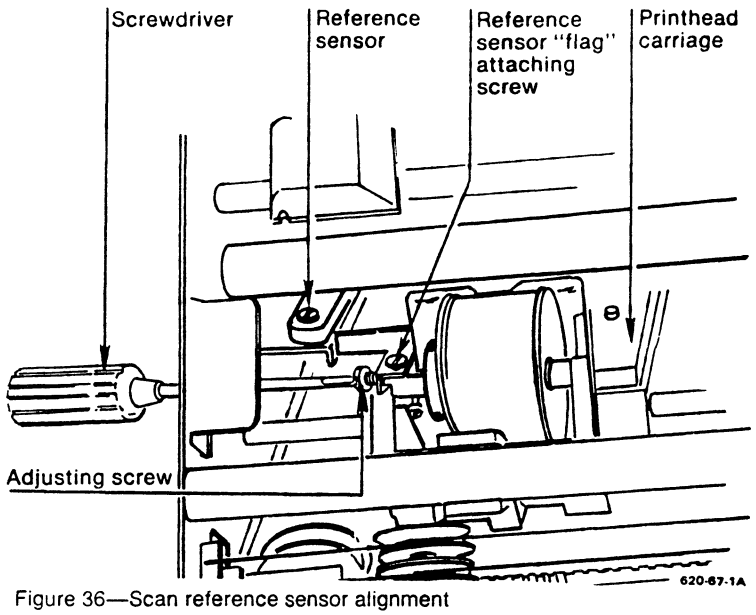


Figure 36—Scan reference sensor alignment

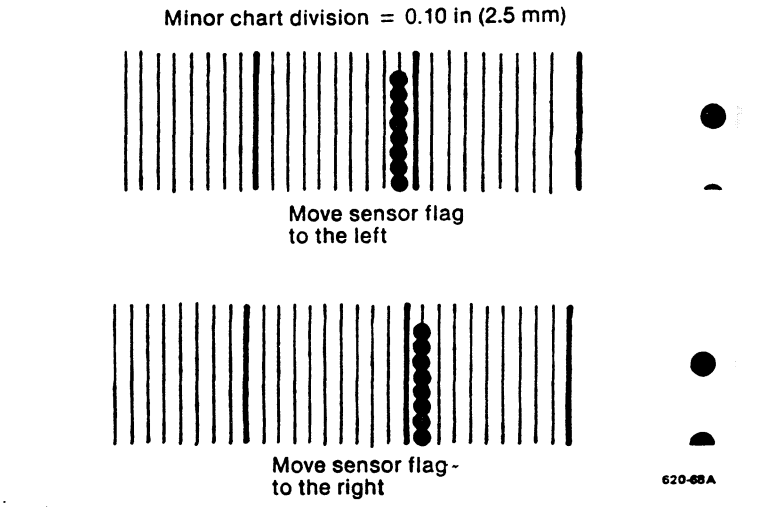


Figure 37—Scan reference sensor "flag" adjustment

Calibration

When to Calibrate

The Reporter must be recalibrated (all five ranges) if either the A/D or CPU board is replaced (for CPU board replacement, see details under Repair heading). Otherwise, the requirements for accuracy in your specific application should determine how often you calibrate the Reporter.

Calibration Accuracy

The specification section lists the reference accuracy for each range.

NOTES:

1. If input burnout protection was added to the Reporter (connector on *both* pins at W2 on the A/D board), 30 microvolts are added to the specification accuracies.
2. If input filtering was added to any channel by adding a connector on the A/D or multiplexer board, 10 microvolts is added to the specification accuracy for that channel.

TABLE 8

Linear Range	Full Scale Calibration Value	Types of Thermocouples and Their Linear Range Assignments
0-20 mV	20 mV	B, S, R
0-50 mV	50 mV	J, K, T, W_5W_{26}
0-100 mV	100 mV	E, Ni-Ni Moly
0-10V	10 Volts	
100 ohm RTD	274.96 ohms	

Calibration on Linear Ranges

The Reporter is only calibrated on linear ranges. You do not have to calibrate the thermocouple ranges because the Reporter automatically assigns the thermocouple ranges to the appropriate linear range, internally (Table 8). Therefore, if the linear range is within specification, the thermocouple range is within specification also. The Reporter has four voltage and one resistance range which are calibrated by applying the full scale value for each range to the Reporter (Table 8).

Summary of Calibration Procedure

For each range, the full scale calibration voltage or resistance is applied to the Reporter. The value is allowed to stabilize for about 10 seconds and then the ENTER key is pressed. After the ENTER key is pressed, the Reporter takes about 30 seconds to process each calibration instruction. During that time the word "Busy" appears in the lower display. When the Reporter is ready to accept the next calibration instruction, the word "Entr" appears in the lower display.

Equipment Requirements

precision volt/millivolt source with ±.01% accuracy,

Resistance decade box with .01 ohm resolution, and overall accuracy within ±(0.01% +2 milliohms)

Laboratory bulb thermometer

Calibration Procedure

Follow this procedure carefully to calibrate the Reporter. Refer to the list of error codes in Table 9 if an error code appears during calibration.

1. Allow one hour for the Reporter to warm up. (Refer to Figure 40 for steps 2 and 3.)

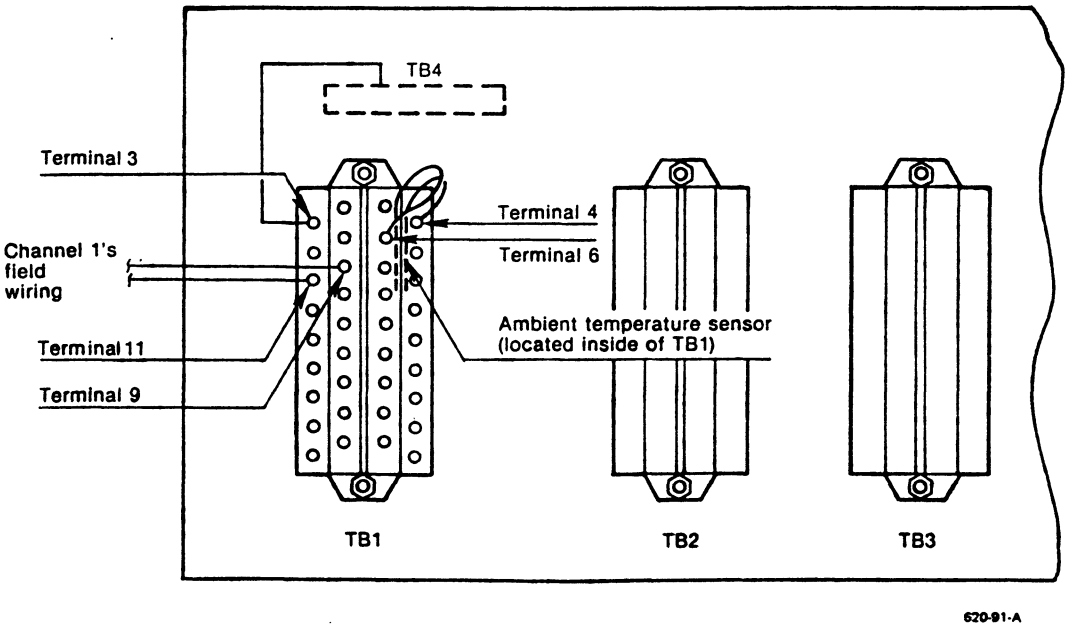


Figure 40—Disconnection of field wiring

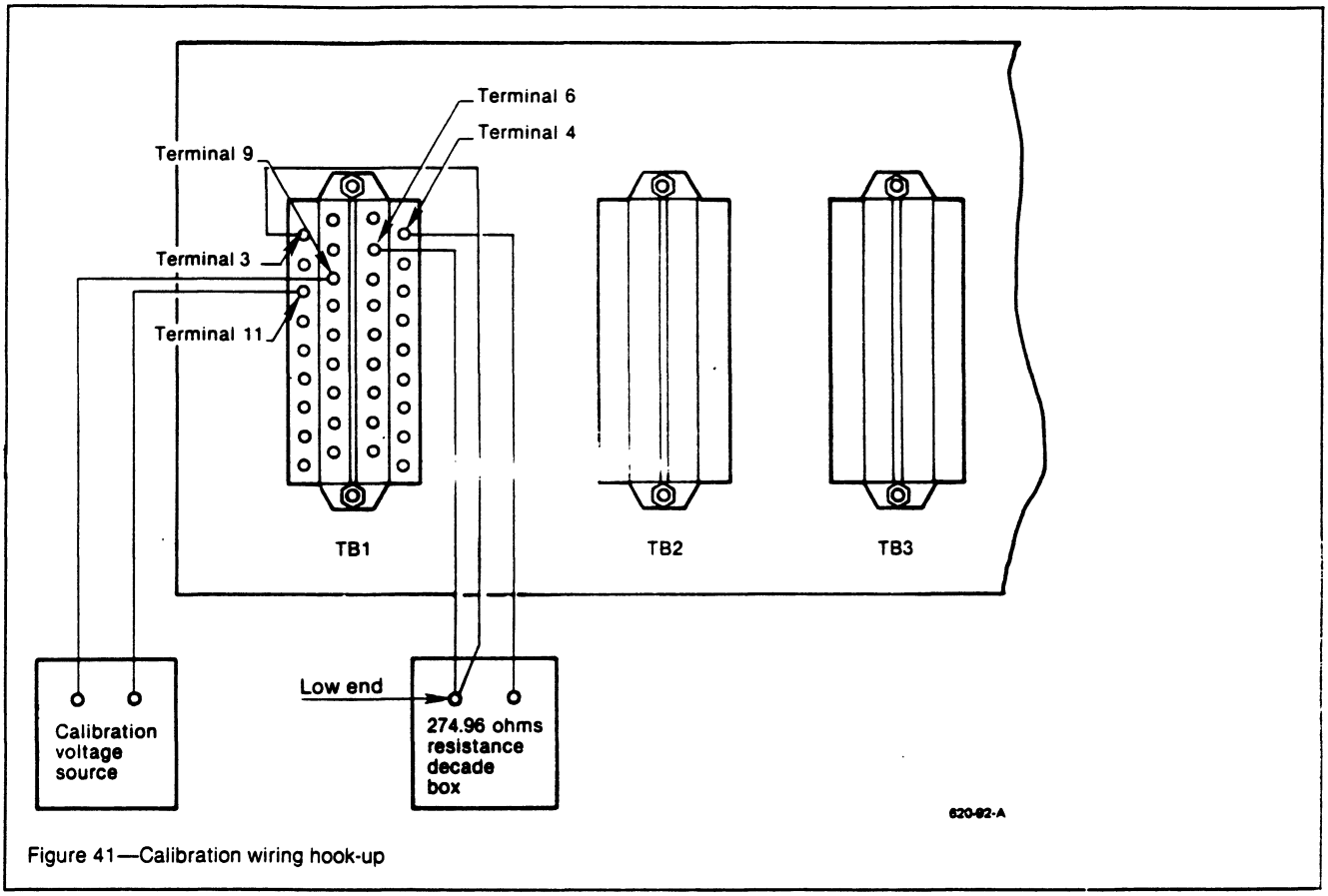


Figure 41—Calibration wiring hook-up

2. Remove the rear cover and disconnect the field wiring from channel 1's input (terminals 9 and 11 of TB1).
3. Disconnect wires from terminals 4 and 6 of TB1 (ambient temperature sensor connection). If present, disconnect wire from terminal 3 of TB-1.
   (Refer to figure 41 for steps 4, 5, and 6.)
4. Connect calibration voltage source to channel 1's input (terminals 9 and 11 of TB1).
5. Connect decade resistance box to terminals 3, 4 and 6 of TB1.
6. Adjust decade resistance box for a resistance of 274.96 ohms.
7. Place diagnostic DIP switch #7 in the "On" position.

8. Press CONF .
9. Enter 1500 or your security code.
10. Press / eight times.
11. Press ENTER .

Calibration of Range 1

12. Adjust calibration voltage source for a 20 millivolt output.
13. Press CAL and enter the number 1 (wait 10 seconds).
14. Press / .
15. Press ENTER .

Calibration of Range 2

16. Adjust calibration voltage source for a 50 millivolt output.
17. Press CAL and enter the number 2 (wait 10 seconds).
18. Press / .
19. Press ENTER .

Calibration of Range 3

20. Adjust calibration voltage source for a 100 millivolt output.
21. Press CAL and enter the number 3 (wait 10 seconds.)
22. Press / .
23. Press ENTER .

Calibration of Range 4

24. Adjust calibration voltage source for a 10 volt output.
25. Press CAL and enter the number 4 (wait 10 seconds).
26. Press / .
27. Press ENTER .

Calibration of Range 5

28. Press CAL and enter the number 5 (wait 10 seconds).

29. Press / .

30. Press ENTER .

TABLE 9 - Calibration Error Codes

E55	Diagnostic configuration DIP switch #7 not set to "On."
E56	Calibration communication error. (Hardware failure is probable. Run power-up diagnostics to locate the fault.)
E57	Calibration error code. Error specific code should appear in the upper display.

Error specific code explanations:

1. Calibration value entered exceeds the maximum permissible value for the range.
2. Zero channel reference failure.
3. Ambient temperature reference channel failure.

Post Calibration

A "CAL message" (Figure 42) is printed on the chart record for each range that is calibrated. After you've calibrated each of the ranges, observe the chart record to verify that the CAL messages were printed. If a CAL message is missing, it means that the Reporter did not do the calibration. Recalibrate the range for which the CAL message is missing.

Verifying Calibration Accuracy

Voltage Ranges

The procedure consists of configuring channel one to accept the full scale value of each voltage range you want to verify, adjusting the voltage source to supply the full scale value to the Reporter, and observing the reading in the middle display.

(Refer to figure 43)

1. Configure channel one for the voltage range you want to verify.

   NOTE: If channel one is normally connected to your process, run a configuration summary before you reconfigure the channel so that when you've completed the verification procedure you can return the channel to its normal configuration.

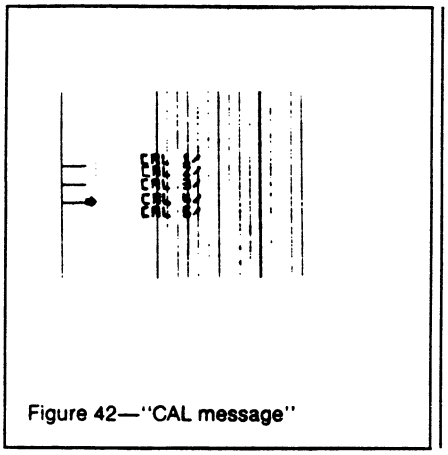


Figure 42—"CAL message"

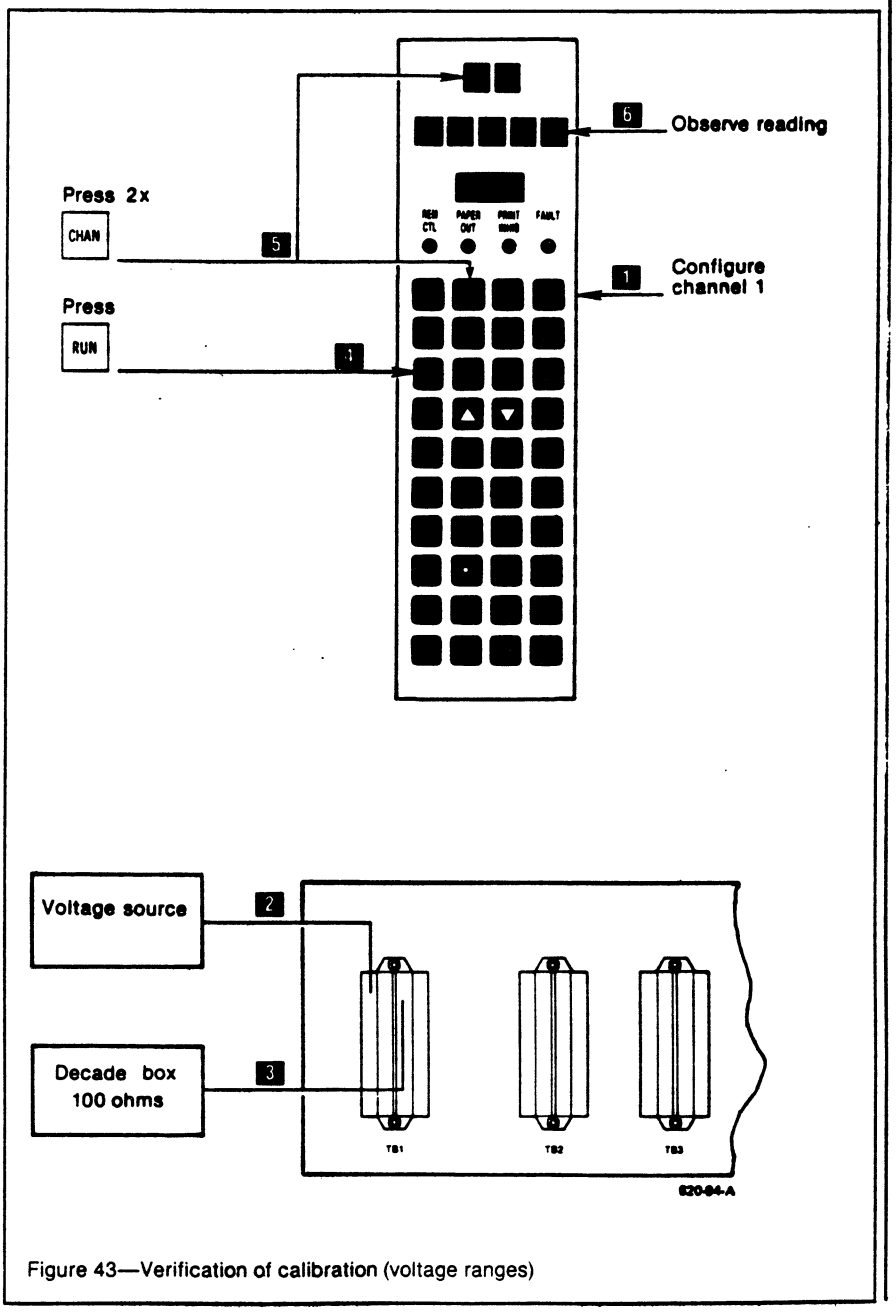


Figure 43—Verification of calibration (voltage ranges)

Procedure for configuring a channel:

Press CHAN .

Enter 1 for channel number.

Press / .

Enter 1 for channel number.

Press / .

Enter 0 for kind of data code.

Press / .

Enter Input type code:
1 for 20 mV range
2 for 50 mV range
3 for 100 mV range
4 for volts range.

Press / .

Enter 0 for input filtering code.

Press / .

*(No entry necessary.)

Press / .

Enter mV for units of measurement.

Press / .

Enter 20 (2000), or 50 (5000), or 100 (1000) or 10 (1000) for upper range limit.

NOTE: To gain greater resolution in the displayed readings, enter the number in parenthesis.

Press / .

Enter 0 for lower range limit.

Press / .

*(No entry necessary.)

Press / .

Press ENTER .

End of channel configuration.

2. Adjust calibration voltage source to the full scale voltage of the range you are verifying: 20 mV, 50 mV, 100 mV or 10 volts.
3. Adjust resistance decade box to 100 ohms.
4. Press RUN .

   The "Run" LED will light.
5. Press CHAN twice to continuously display channel one. (If you only press the key once, the Reporter will scan all the active channels.)
6. Observe the reading in the middle display. If the reading is not within tolerance, do the reiterative calibration procedure.

Resistance Range

If you want to determine how accurate the calibration of the ambient temperature RTD is, follow this verification procedure.

The procedure consists of configuring channel one as a "J" type thermocouple then applying zero volts to channel one. The middle display will then read the ambient temperature of the input block. Using a laboratory bulb thermometer you measure the temperature of input block TB1 near the input to channel 10. The temperature reading on the thermometer should be the same as the temperature reading on the Reporter's middle display within ±2°F. Refer to Figure 44.

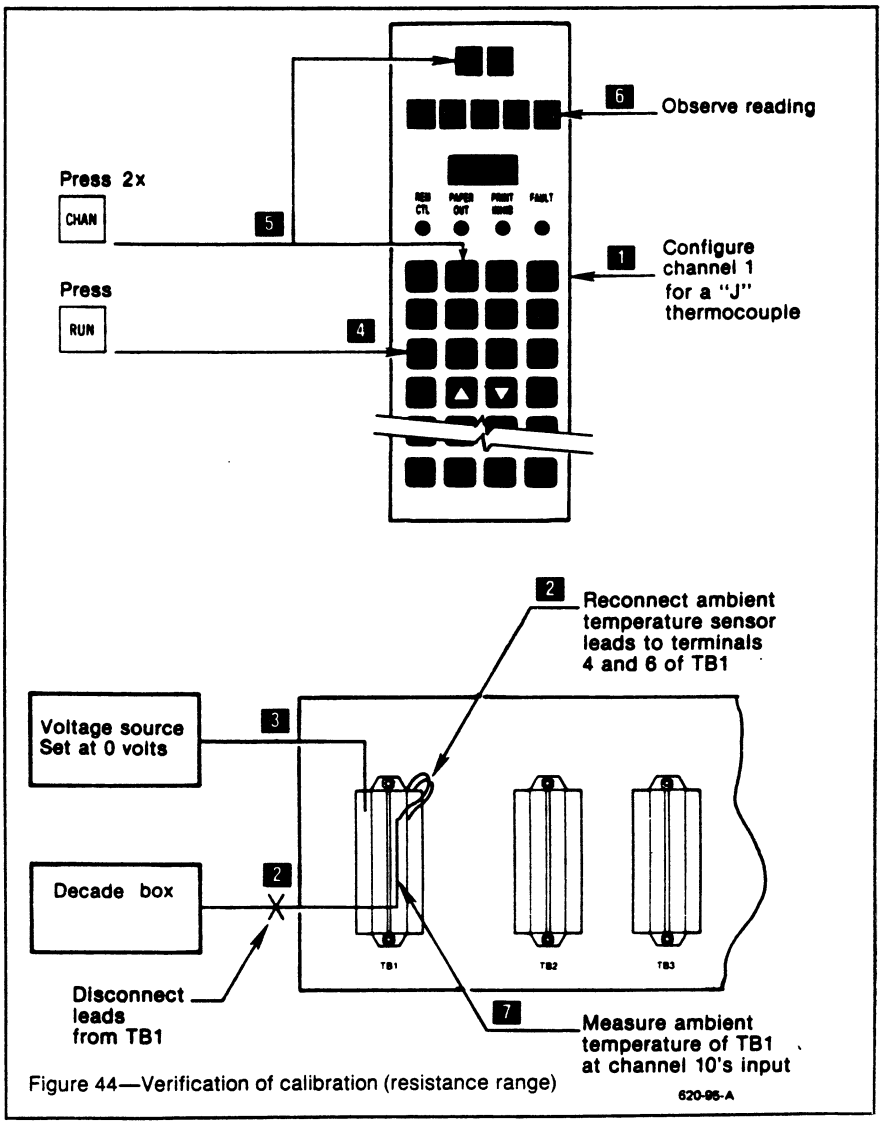


Figure 44—Verification of calibration (resistance range)

Procedure:

1. Configure channel one for "J" type thermocouple.

   Press [CONF].

   Enter security code.

   Press [CHAN].

   Enter 1 for channel number.

   Press [/].

   Enter 1 for channel number.

   Press [/].

   Enter 12 for input type code.

   Press [/].

   Enter 0 for the type of data.

   Press [/].

   Enter 0 for input filter code.

   Press [/].

   *(No entry necessary.)

   Press [/].

   Enter °F for units of measurement.

   Press [/] three times.

   Press [ENTER].

   End of channel configuration.
2. Disconnect the resistance decade box leads from terminals 3, 4 and 6 of TB1, and reconnect the ambient temperature sensor leads to terminals 4 and 6 of TB1, and if present the wire from TB4-6 to terminal 3.
3. Apply 0 volts to channel one.
4. Press [RUN].

   The "Run" LED will light.
5. Press [CHAN] twice.

   The Reporter will display channel one.
6. Observe the reading in the middle display.
7. Use a laboratory bulb thermometer to measure the temperature of the terminal block TB1 at the channel ten input. The reading on the middle display and the thermometer reading should be within ±2°F of one another.

Reiterative Calibration

Voltage Ranges

1. Record the reading on the middle display in step 6 of the Verification procedure.
2. Calculate the new calibration value from the following:

   $V_{CALIB\text{-}NEW} = V_{CALIB\text{-}OLD} + [V_{VERIF} - V_{F.S.}]$,

   Where—

   $V_{CALIB\text{-}NEW}$ = the new calibration value,

   $V_{CALIB\text{-}OLD}$ = the old calibration value,

   V_{VERIF} = the value of the reading during verification with the full scale value as an input,

   $V_{F.S.}$ = the full scale value for the range being calibrated.
3. Return to the configuration mode:

   Press [CONF].

   Enter security code.

   Press [/] eight times.
4. Adjust the calibration voltage source to read the value calculated in step 2 above.
5. Repeat calibration procedure using the value calculated in step 2 above.
6. Repeat the verification and reiterative calibration procedures as many times as necessary.

Resistance Range

1. Calibrate the range for 100 ohm RTD according to the procedure outlined in the calibration section.
2. Disconnect the ambient temperature sensor leads from terminals 3, 4 and 6 of TB1, and connect the resistance decade box leads to terminals 3, 4 and 6 of TB1. Adjust the resistance decade box to 100.00 ohms.
3. Press [RUN].

   The "Run" LED will light.
4. Press [CHAN] twice.

   The Reporter will display channel one.
5. Observe the reading in the middle display with zero volts on channel one.
6. Calculate the new calibration value from

   $R_{CALIB\text{-}NEW} = R_{CALIB\text{-}OLD} + [T_{100\,ohm} - 32°f] \times 0.2139\ ohm/°F$

   Where—

   $R_{CALIB\text{-}NEW}$ = the new calibration value,

   $R_{CALIB\text{-}OLD}$ = the old calibration value,

   $T_{100\,ohm}$ = the temperature reading in °F on the middle display in RUN mode.
7. Return to the configuration mode:

   Press [CONF].

   Enter security code.

   Press [/] eight times.
8. Adjust the calibration resistance to the value calculated in step 6.
9. Repeat the calibration procedure using the value calculated in step 6 above for range 5.
10. Repeat steps 1 through 9 until the reading on the middle display in step 5 is within ±0.5°F of 32°F.
11. Reconnect the ambient temperature sensor wires into terminals 4 and 6 of TB1, and repeat the Verification of Calibration for the resistance range.
12. Return switch 7 of the switch assembly on the CPU board to OFF.

Repair

Caution:
Remove power from the Reporter before removing or replacing p.c. boards.

Removal of CPU Board

1. Unplug connectors J1, J2, and J3 on the CPU board.
2. Loosen (don't remove) two screws on CPU board hold-down.
3. Slide the hold-down to the front of the chassis and up. Then remove hold-down.
4. Lift CPU board straight up to remove from chassis. If you're removing CPU board for servicing, remove CPU board cover by unscrewing four screws that attach cover to CPU board.

Reconfiguration

If you replace the CPU board, you must recalibrate and reconfigure the Reporter. Data to be reconfigured includes the operating data and the functional option codes that express to your Reporter which functional options should be active. These two kinds of configurable data are entered into the EEPROM memory through two different procedures. You may not be familiar with the configuration of functional options because it is initially done at the factory and is not normally changed. These configuration instructions will be found under the heading Configuring Functional Options a few paragraphs below. The instructions that tell how to configure operating data can be found in the Configuration section of the manual. If you have a configuration summary sheet available that is up to date, you should use this sheet as a reference in reconfiguring the new CPU board memory. Calibration instructions are included in the service section:

NOTE: All of the calibration and configuration data is stored in U55, a non-volatile EEPROM. In cases where the CPU board is determined to be faulty, but U55, specifically, has not failed, you can remove U55 from the old board (the one you're replacing) and install it on the replacement board (after you remove U55 on the replacement board). By following this procedure you can avoid reconfiguring and recalibrating the Reporter and thereby significantly reduce Reporter down time.

Configuring functional Options

Start here

Place diagnostic configuration switch #7 in the "ON" position.

Press [CONF]

Enter 1500 or your security code

Press [/]

Enter number of channels (14, 22, or 30)

Press [/]

Enter color code (0 = one color, 1 = six color)

Press [/]

Enter Digital I/O option code (0 = without Digital I/O option, 1 = with Digital I/O option).

Press [/]

Enter external (ext) communication (com) option code (0 = without ext comm, 1 = with ext comm).

Press [/]

Enter RTD input option code (0 = with RTD option, 1 = without RTD option)

Press [/]

Enter chart speed-temperature units code

0 = inches/hour-°F.
1 = inches/hour-°C.
2 = centimeters/hour-°F.
3 = centimeters/hour-°C.

Press [/]

Enter latched output relay code (0 = without latched relay, 1 = with latched relay)

Press [LIST]

Press [ENTER]

Place diagnostic configuration switch #7 in "off" position.

Removal of A/D board (Figure 50)

1. Disconnect three A/D board connectors.
2. Loosen A/D board latch screw. Move latch down.
3. Pull A/D board straight out.

Recalibration
If you replace the A/D board you must recalibrate the Reporter. Refer to the Calibration section of the manual.

Installation of Jumpers
The use of jumpers on the A/D board provides for the accommocation of various classes of operation on the one board. Some jumpers affect the operation of the entire A/D board, and other jumpers affect only one channel. If you replace an A/D board be sure to install jumpers on the new A/D board. Probably the easiest way to do this is to use the old A/D board as a guide to the replacement of jumpers on the new board. Or you can determine your particular operational requirements and use the data below to install the jumpers.

The list below describes the jumpers that must be installed to accomplish a specific function.

Jumper #	Operational condition
W1	Always installed
W25	Never installed
W26	Never installed
W2	Thermocouple burnout
W3	50 Hz line operation
W4	60 Hz line operation

Removal of Expansion Multiplexer boards (Figure 50)

1. Remove chassis.
2. Disconnect expansion multiplexer board connectors.
3. Loosen the two hold-down plate screws and remove hold-downs.
4. Pull board straight out.

This board provides an additional 8 analog input channels to the Reporter. It can be used for channels 15 through 22 or 23 through 30. To prepare an expansion multiplexer board for operation on channels 15 through 22 install jumper 17 and plug the expansion multipelxer board into TB2. To prepare an expansion multiplexer board for operation on channel 23 through 30, install jumper W18 and plug expansion multiplexer board into TB3.

Channel #	**This column identifies the jumper that must be installed to wire a channel for anti-aliasing filtering. This jumper should not be installed if the channel will be fed by an RTD input.**	**This column identifies the jumpers that must be installed to wire a channel for a *RTD* input. These jumpers should not be installed if the channel is wired for anti-aliasing filtering.**
1	W35	W5, W6
2	W44	W23, W24
3	W36	W7, W8
4	W46	W27, W28
5	W47	W29, W30
6	W37	W9, W10
7	W48	W31, W32
8	W38	W11, W12
9	W40	W15, W16
10	W39	W13, W14
11	W48	W33, W34
12	W43	W21, W22
13	W42	W19, W20
14	W41	W17, W18
0	W45	

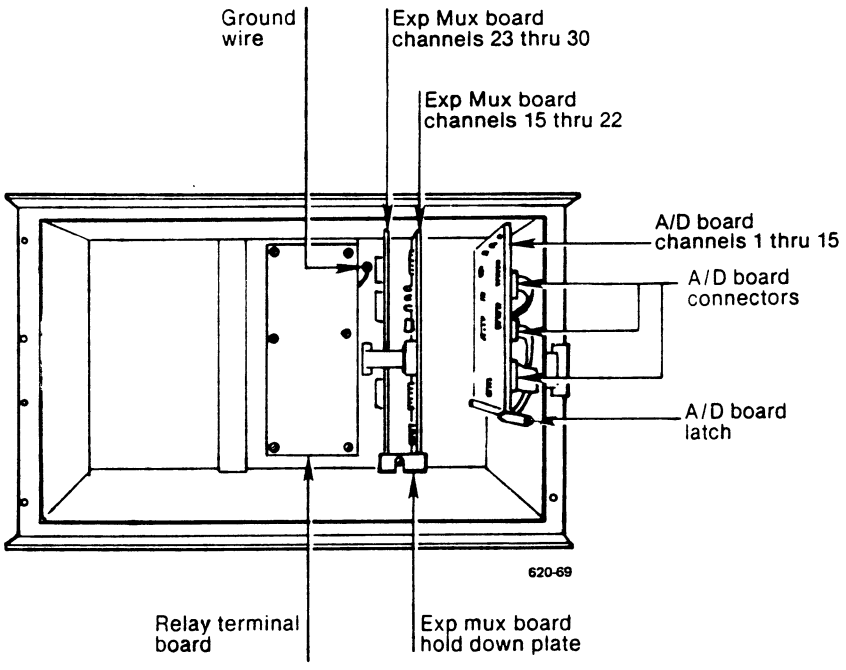

Ground wire
Exp Mux board channels 23 thru 30
Exp Mux board channels 15 thru 22
A/D board channels 1 thru 15
A/D board connectors
A/D board latch
620-69
Relay terminal board
Exp mux board hold down plate

Figure 50—Case boards removal

Removal of Digital I/O Board

1. Unplug connectors J1, J2, and J3 on the Digital I/O board.
2. Loosen (don't remove) two screws in dual hold-down.
3. Remove retainer by lifting straight up.
4. Remove I/O board by lifting straight up.

PS/PC Board

1. Remove Digital I/O board.
2. Disconnect connectors J1, J2, J3, J4, J5, J6, and J7. Tag the plugs of connectors J3 and J4 to prevent confusing them when plugging them back in.
3. Remove PS/PC board by lifting straight up.

Removal of Keyboard-Display assembly (Figure 51)

1. Remove CPU board.
2. Disconnect connector J2 from display board.
3. Remove keyboard-display assembly by removing two screws that attach keyboard-display to chassis.

Channel #	**This column identifies the jumper that must be installed to wire a channel for anti-aliasing filtering. This jumper should not be installed if the channel will be fed by an RTD input.**	**This column identifies the jumpers that must be installed to wire a channel for a RTD input. These jumpers should not be installed if the channel is wired for anti-aliasing filtering.**
15	W19	W1, W2
16	W20	W3, W4
17	W21	W5, W6
18	W22	W7, W8
19	W23	W9, W10
20	W24	W11, W12
21	W25	W13, W14
22	W26	W15, W16
23	W19	W1, W2
24	W20	W3, W4
25	W21	W5, W6
26	W22	W7, W8
27	W23	W9, W10
28	W24	W11, W12
29	W25	W13, W14
30	W26	W15, W16

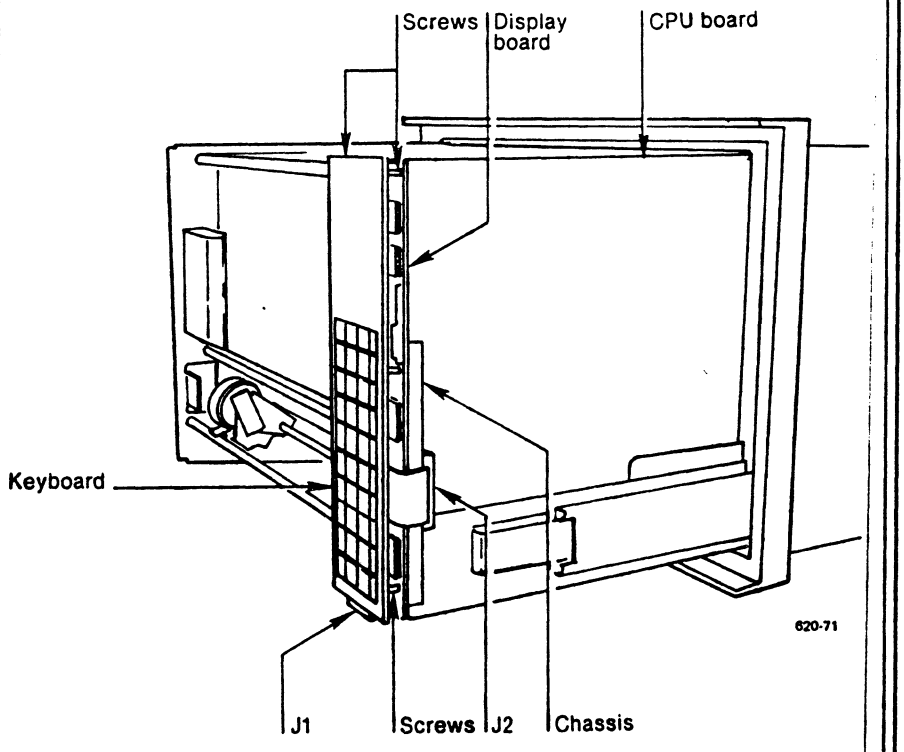


Figure 51—Keyboard-display assembly

Removal of Display board from Keyboard

1. Disconnect connector J1 from display board.
2. Remove six screws that attach display board to keyboard.

Removal of discrete LED segments (Figure 52)

1. Remove keyboard-display assembly.
2. Remove display board from keyboard.
3. Unplug LED segments.

Removal of fan

1. Pull out chassis to service position.
2. Remove chart.
3. Disconnect fan motor connector.
4. Support fan from underneath while removing four screws from top of support plate.
5. Remove fan from under chassis. Use care to avoid damaging belts and ribbon cable.

Replacing ambient temperature compensation RTD

1. Turn off power to Reporter.
2. Remove back cover.
3. Locate the ambient temperature compensation RTD.
4. Remove ambient temperature compensation RTD.
5. Install new ambient temperature resistor and heat transfer compound.

Relay Output Board Removal (Figure 50)

1. Tape and disconnect external wires connected to relay terminal board.
2. Remove chassis from case
3. Disconnect connector to relay output board.
4. Disconnect ground wire attached to case.
5. Remove six screws (from the inside of the unit) that attach the relay board to the rear of the case.

Chassis Removal

1. Disconnect ground wire from left side plate by loosing screw.
2. Disconnect J6 on the PS/PC board.
3. Disconnect fan connector.
4. Unscrew fan wire hold down.
5. Remove wire from chassis through opening in left side plate.
6. Disconnect J2 on digital I/O board.
7. Disconnect J3 on digital I/O board.
8. Disconnect J3 on CPU board.
9. Remove screws from left and right side plate that hold chassis to sliding "arms".
10. Tilt rear of chassis up slightly and pull out.

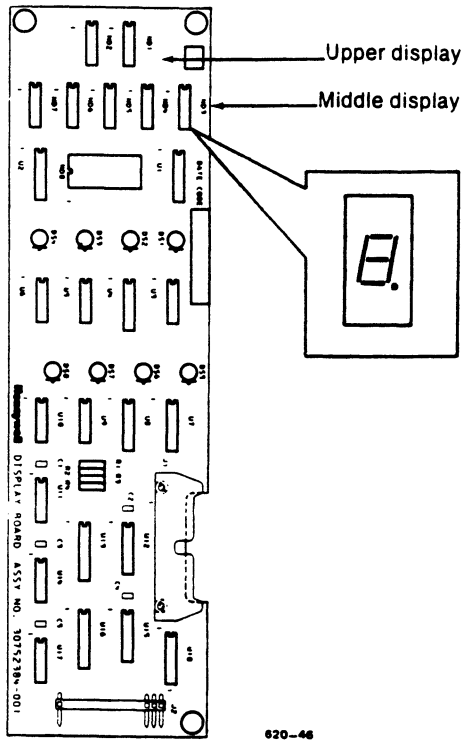


Figure 52—Removal of discrete LED segments

Removal of overrun switch

1. Remove CPU board.
2. Unsolder two wires connected to switch.
3. Remove two screws holding overrun switch to bracket.

Filter Assembly Removal

WARNING: Turn off the power to the Reporter before removing filter assembly. Line voltage and 660 Vac is present in filter assembly.

1. Turn off power to the Reporter.
2. Disconnect rear terminal line voltage connections (Figure 53).
3. Remove 3 screws from the inside of chassis (Figure 54.
4. Remove 2 screws from the outside of chassis (Figure 55).
5. Pull out subassembly gently (for testing purposes, subassembly probably doesn't have to be completely removed.
6. To completely remove subassembly, tag wires and disconnect plugs.

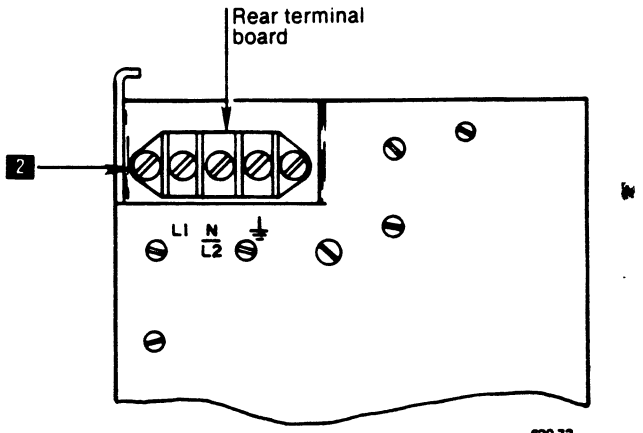


Figure 53—Filter assembly removal 620-72

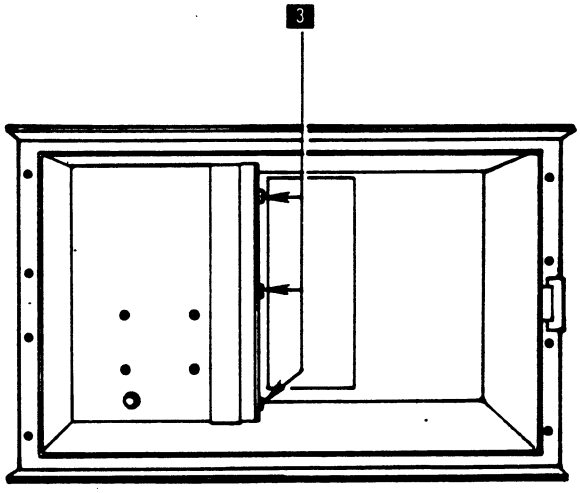


Figure 54—Filter assembly removal 620-70

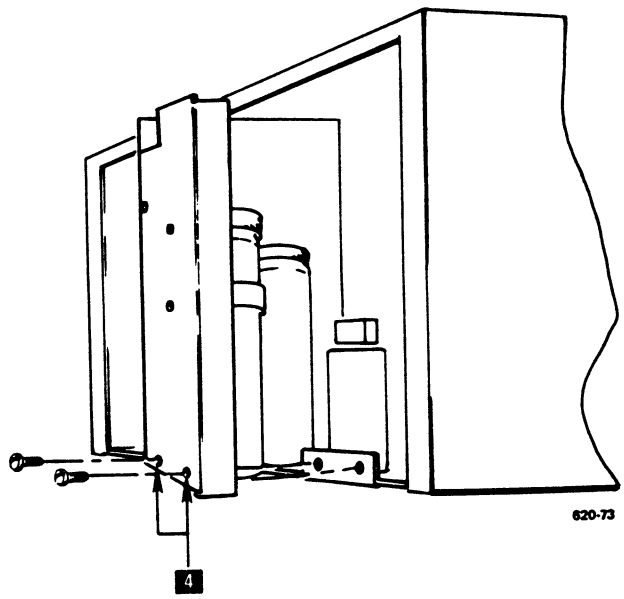
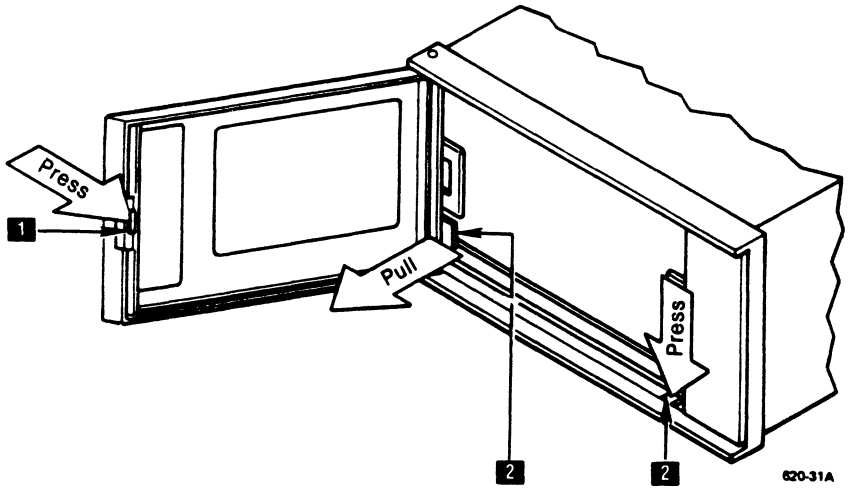


Figure 55—Filter assembly removal

Chassis Withdrawal (Maintenance) (Figure 56)

1 Unlock if required, then press the latch on the right edge, and pull the door open.

2 Press the latch on the right side of the bottom of the case; then pull the chassis until the latches on the rails catch.



Figu . 56 -- Withdrawing chassis to maintenance position

Chassis Withdrawal (Service) (Figure 57)

1 Open the door, and withdraw the chassis to the maintenance position.

2 Remove the stop-screws from the rails.

3 Press the latches on the rails, then pull the chassis until the latches catch.

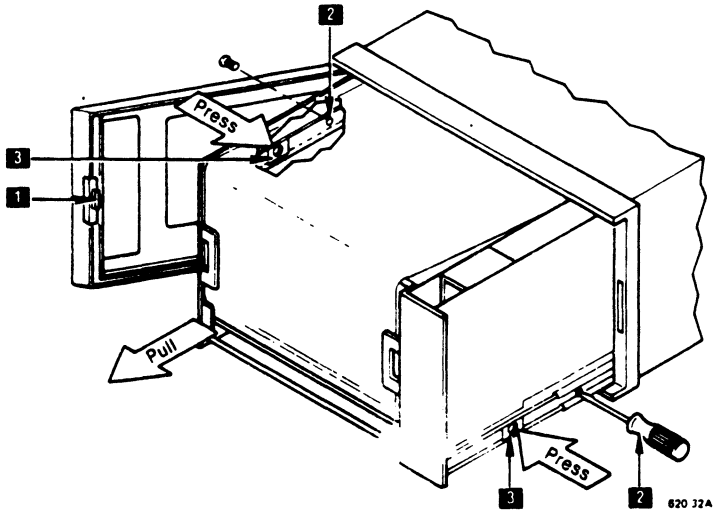


Figure 57—Withdrawing chassis to service position

Returning Chassis to Case (Figure 58)

NOTE: Steps 1 and 2 are only applicable if the chassis is withdrawn t othe service position.

1 Press the latches on the rails, and push the chassis until the latches on the rails catch.

2 Reinstall the stop-screws.

3 Press the latches on the rails, and push the chassis until the latch on the case catches.

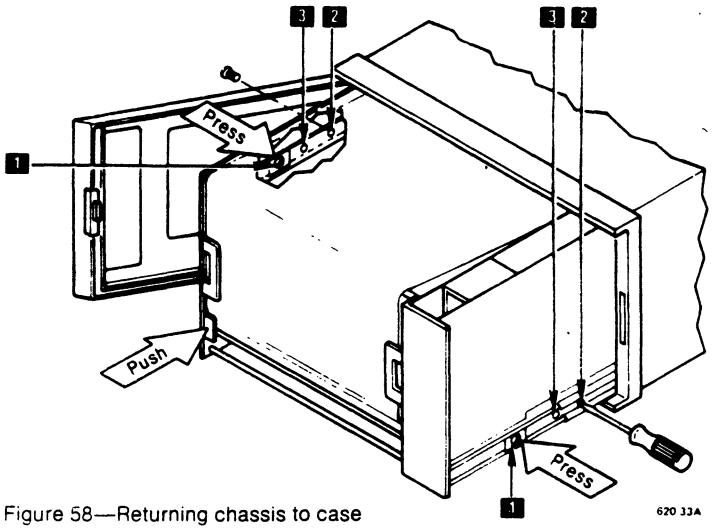


Figure 58—Returning chassis to case

DPR 1500
Digital Process Reporter

Parts List

Instructions

- Inoperative printed circuit board assemblies identified with a "✓" in the column headed Exchange Policy Applies can be returned to the nearest Honeywell, PCD branch office for credit.
- All parts (Figure 1) listed are available for replacement purposes. Check with the nearest Honeywell, PCD branch office for minimum order charges.
- Hardware marked with an asterisk is commercially available.
- Part numbers identified with a (K) are kits containing the described parts.
- Listings of the parts in the kits and a table of replaceable integrated circuits appear on page 16.

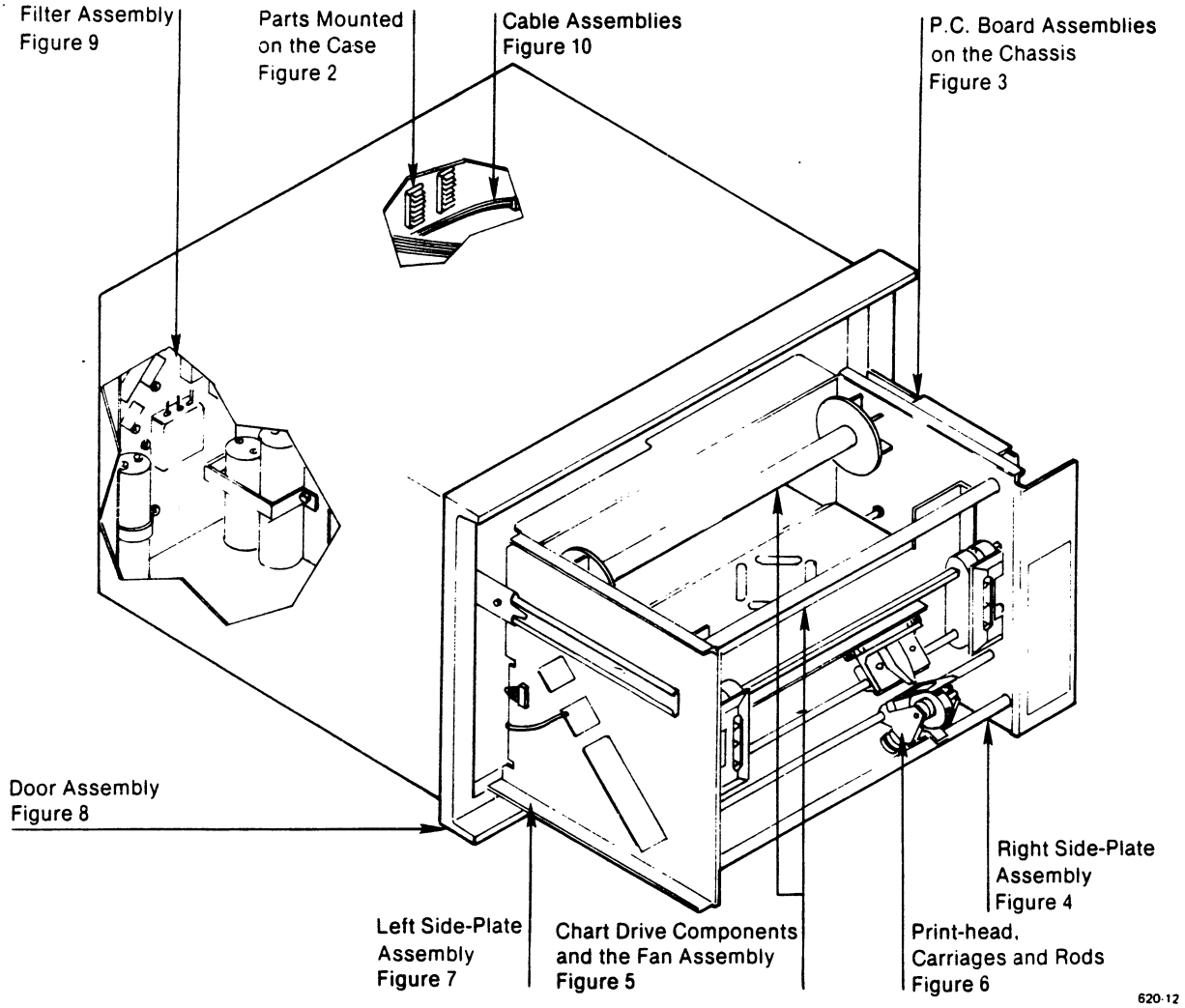


Figure 1 — Overview of Parts and Assemblies

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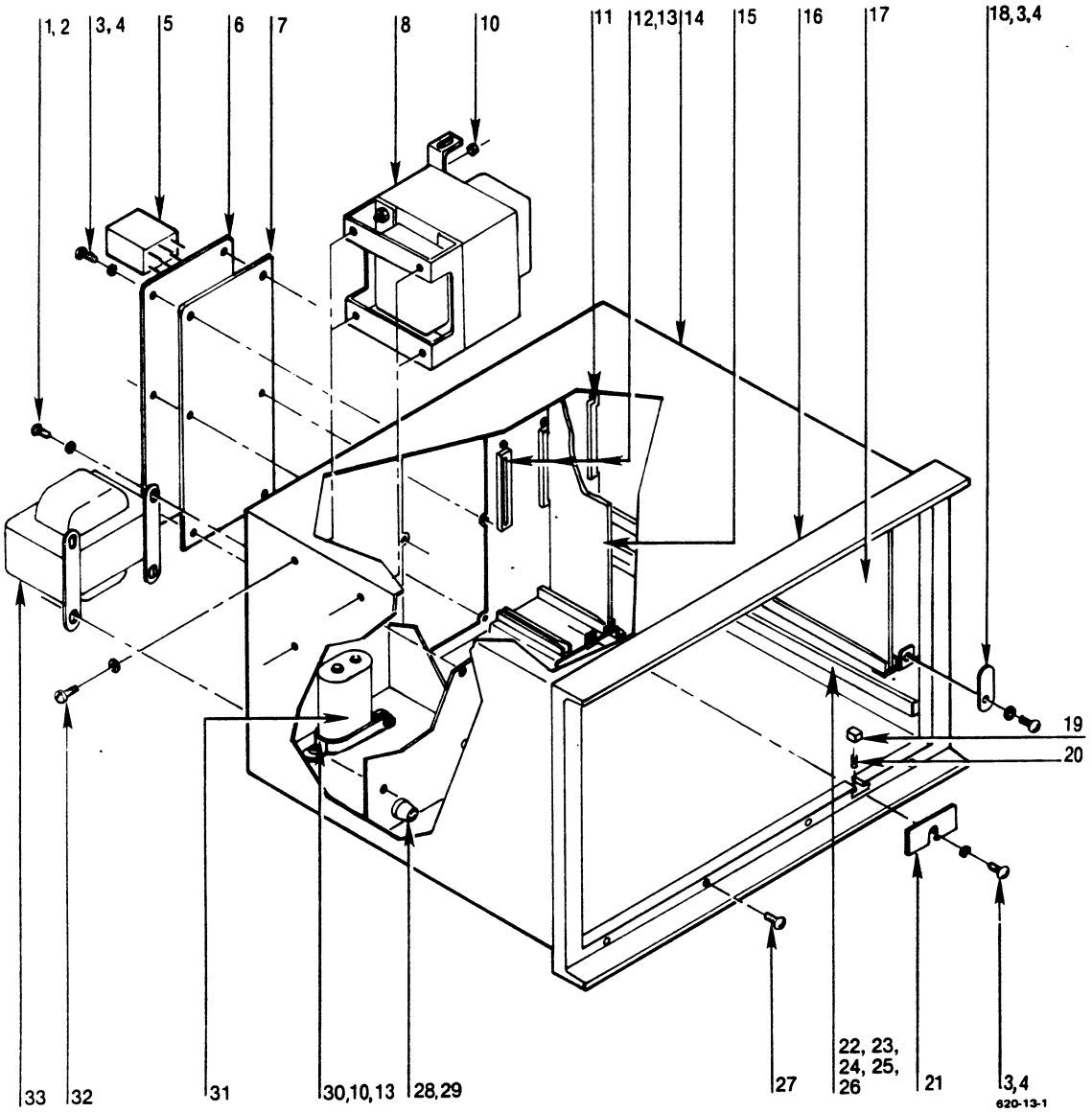

Figure 2 — Parts mounted in the case

FIGURE 2

Key Number	Part Number	Description	Quantity	Spares for 10 Instruments	Spares for 100 Instruments	Exchange Policy Applies
1	30000005-003*	Screw, Bd. Hd., 10-32 × .18 in	4			
2	30000914-000*	Lockwasher, Size 10	4			
3	30000005-603*	Screw, Bd. Hd., 6-32 × .18 in	4			
4	30006583-000*	Lockwasher, Size 6	27			
5	62795413-002	Relay, Output	6	2	6	
6	30753041-001	Plate, Legend	1			
7	30753378-501	Relay Input/Output P.C. Board Assembly	1	1	3	✓
8	30752594-501	Transformer	1			
10	30004906-000*	Nut, Hex. Hd., 6-32	6			
11	30752648-002	Terminal Block	3			
12	30752943-001	RTD, Ambient Temperature Compensation	1			
13	30000005-607*	Screw Bd. Hd, 6-32 × .43 in.	6			
14	30752700-001	Case	1			
15	30752390-501	Expansion Multiplexer P.C. Board Assembly	1	1	3	✓
16	30752724-001	Bezel	1			
17	30752387-501	Analog/Digital P.C. Board Assembly	1	1	3	✓
18	30752717-001	Tab, Locking	1			
19	30752732-001	Spring	1			
20	30752712-001	Latch, Chassis	1			
21	30752718-001	Tab, Locking	1			
22	30752510-001	Slide	2			
23	30000005-605*	Screw, Bd. Hd., 6-32 × .31 in	8			
24	30004972-000*	Washer, Flat, Size 6	8			
25	30752218-001*	Spacer (Slide Step)	2			
26	30000080-605*	Screw, Fil. Hd., 6-32 × .31 in.	2			
27	30000005-606*	Screw, Bd. Hd., 6-32 × .38 in	7			
28	30753110-001	Fuse Assembly	1			
29	(K) 30753447-001	Kit, Fuse (See list at end of section)	1	1	3	
30	30753045-001	Strap	1			
31	30752775-001	Capacitor	1			
32	30000005-604*	Screw, Bd. Hd., 6-32 × .25 in	14			
33	30752721-501	Transformer, Linear	1			

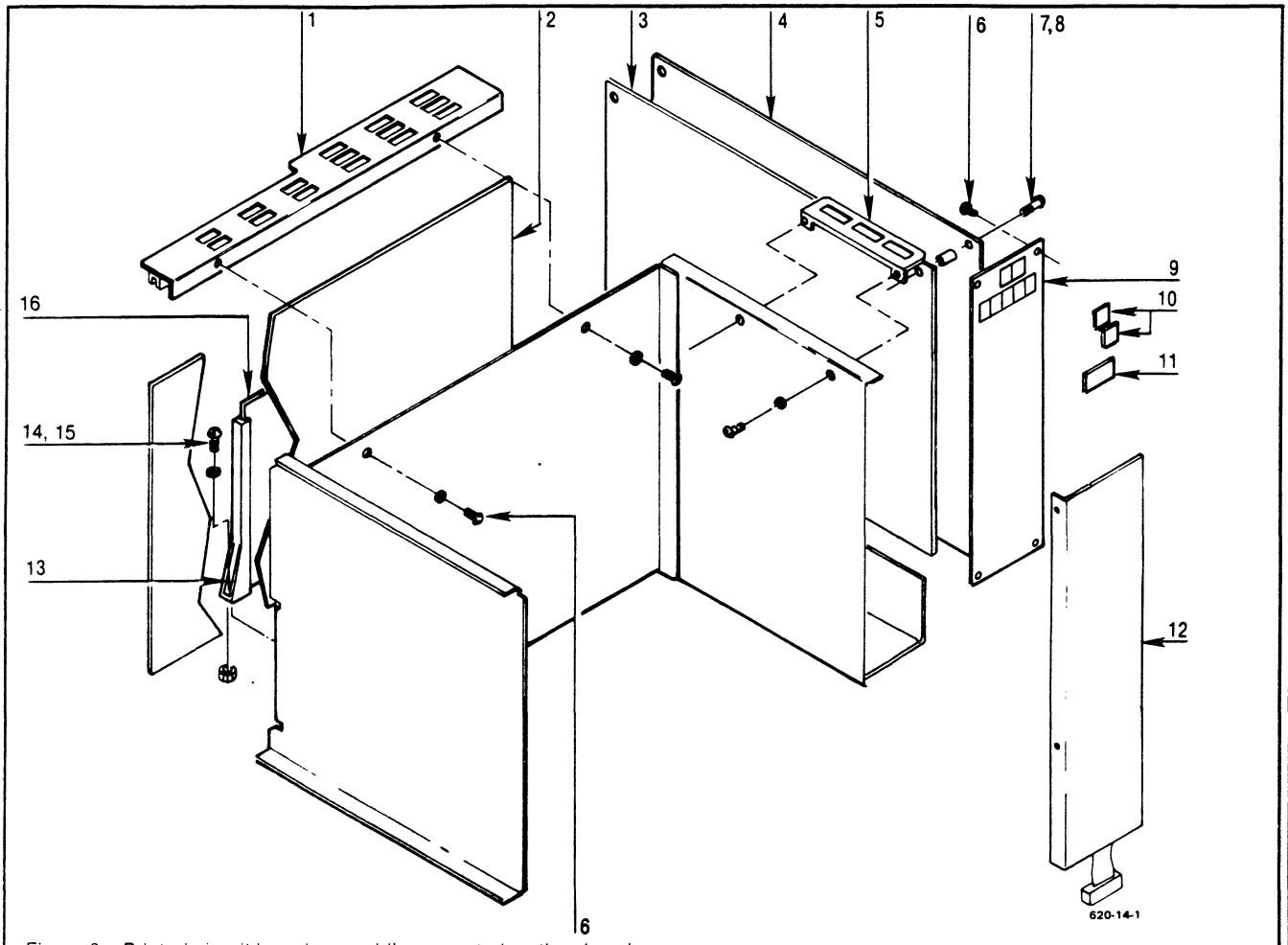

Figure 3—Printed circuit board assemblies mounted on the chassis

FIGURE 3

Key Number	Part Number	Description	Quantity	Spares for 10 Instruments	Spares for 100 Instruments	Exchange Policy Applies
1	30752663-002	Hold-down, Dual	1			
2	30752372-501	Power Supply/Print Control P.C. Board Assembly	1	1	3	✓
3	30752381-501	Central Processor Unit P.C. Board Assembly	1	1	3	✓
4	30752670-001	Shield	1			
5	30752662-001	Hold-down	1			
6	30000005-604*	Screw, Bd. Hd., 6-32 × .25 in	4			
7	30753104-001	Spacer	4			
8	30000005-403*	Screw, Bd. Hd., 4-40 × .25 in	8			
9	30752384-501	Display P.C. Board Assembly	1	1	3	✓
10	99001040-001	Seven-Segment Display	3	3	9	
11	99001155-001	Display	1			
12	30752512-501	Keyboard Assembly	1	1	3	
13	30752726-001	Guide Card	1			
14	30000012-608*	Screw, F. Hd., 6-32 × .5 in	1			
15	30004906-000*	Nut, Hex, 6-32	1			
16	30752375-501	Digital Input/Output P.C. Board Assembly	1	1	3	✓

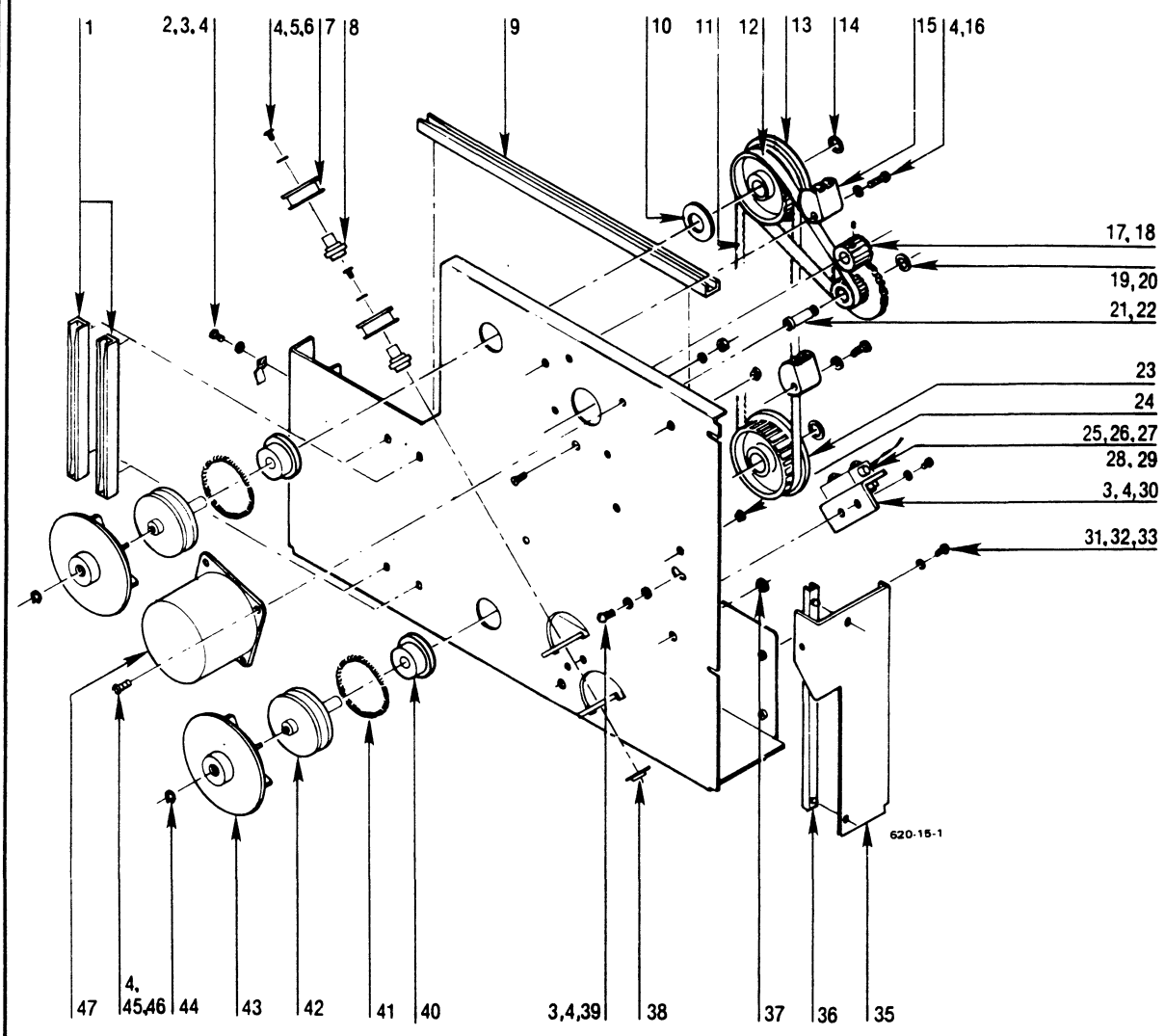

Figure 4 — Right sideplate assembly

FIGURE 4

Key Number	Part Number	Description	Quantity	Spares for 10 Instruments	Spares for 100 Instruments	Exchange Policy Applies
1	30731586-002	Guide, Card	3			
2	30752650-001	Clip, Cable	1			
3	30000005-804*	Screw, Brass Bd. Hd., 8-32 X .25 in	5			

FIGURE 4 (continued)

Key Number	Part Number	Description	Quantity	Spares for 10 Instruments	Spares for 100 Instruments	Exchange Policy Applies
4	30070598-000*	Lockwasher, Size 8	7			
5	30000011-812*	Screw, Steel, Hex Head, 8-32 X .75 in	2			
6	30364998-000*	Washer, Size 8	3			
7	30752290-001	Pulley	2	1	3	
8	30752299-001	Stud, Pulley	2			
9	30731586-001	Guide, Card	1			
10	30371041-124	Retaining Ring	2			
11	30752277-002	Belt	2			
12	30752277-003	Belt	1			
13	30752264-002	Pulley, Upper	1			
14	30371539-108	E Ring	2			
15	30752433-001	Guide, Belt	3			
16	30000005-810*	Screw, Bd. Hd., 8-32 x .63 in.	3			
17	30752265-001	Gear	1			
18	30040857-002	Setscrew, 6-32 X .18 in.	2			
19	30371524-108	Retaining Ring	1			
20	30752268-001	Gear	1			
21	30752273-001	Stud	1			
22	30000012-603*	Screw, steel Fl. Hd., 6-32 X .19	1			
23	30752264-003	Pulley, Lower	1			
24	30752278-001	Bearing	2			
25	30752675-001	Sensor Cable	1	1	3	
26	30000005-207*	Screw, Bd. Hd., 2-56 x .43 in.	2			
27	30040338-000*	Washer, Flat, Size 2	2			
28	30006581-000*	Lockwasher, Size 2	2			
29	30004900-000*	Nut, Size 2	2			
30	30752293-001	Bracket, Switch	1			
31	30000005-604*	Screw, Bd. Hd., 6-32 X .25 in	2			
32	3006583-000*	Lockwasher, Size 6	3			
33	30368343-001*	Washer, Size 6	3			
35	30752464-002	Bracket, Card guide	1			
36	30731586-003	Guide, Card	1			
37	30752418-001	Bearing	3			
38	30752300-001	Retainer	2			
39	30000011-605*	Screw, Steel, Hex. Head-6-32 X .31 in				
40	30752271-001	Bearing, Reroll	2			
41	30752270-001	Spring, Garter	2			
42	30752263-001	Hub	2			
43	30752434-001	Disc, Chart-Roll	2			
44	30371524-105	Ring, Retaining	2			
45	30000005-806*	Screw, Bd. Hd., 8-32 X .38 in	4			
46	30004908-000*	Nut, Hex Size 8	4			
47	30752280-001	Motor, Chart Drive	1	1	3	

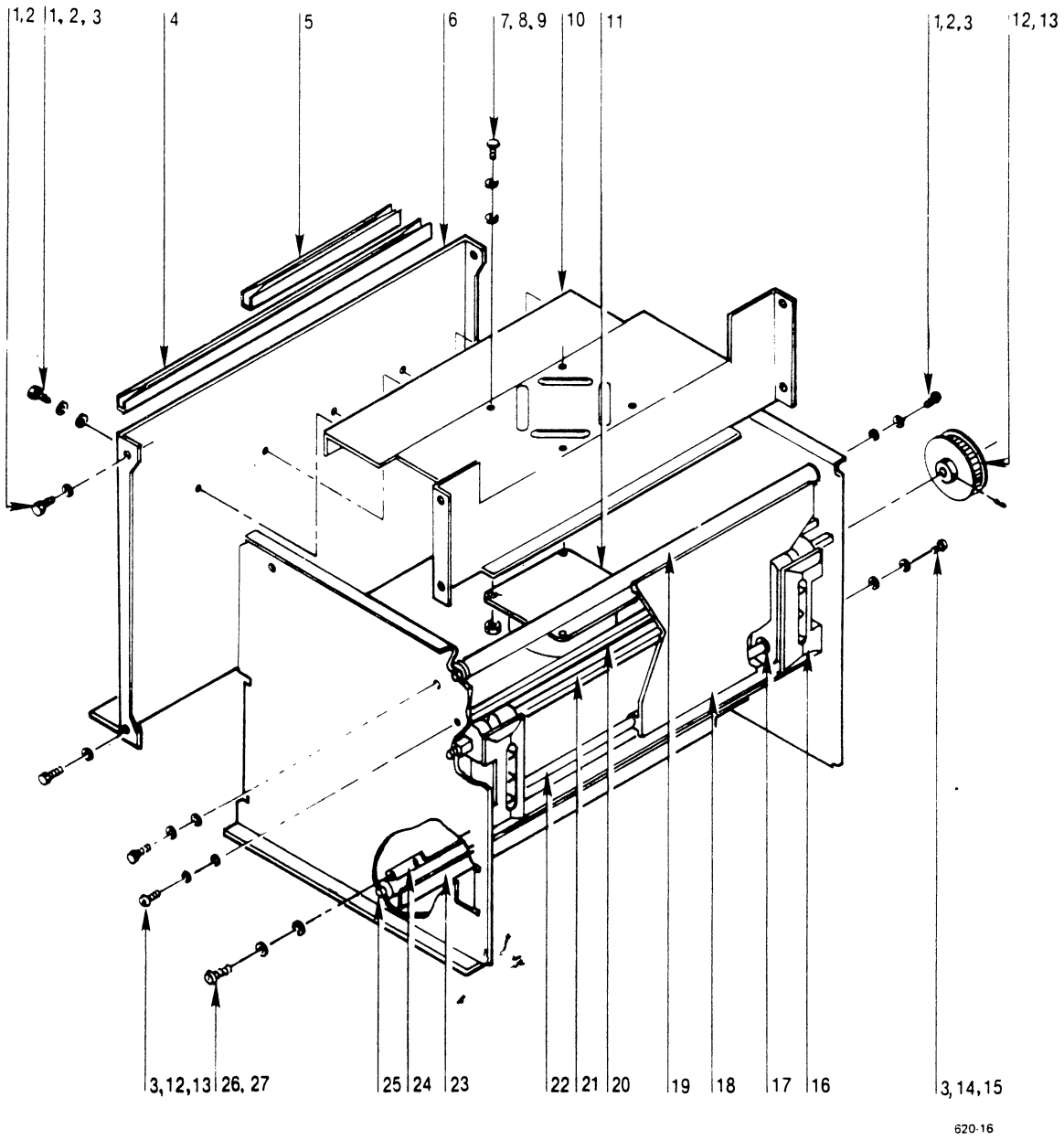

Figure 5 — Chart drive components and the fan assembly

FIGURE 5

Key Number	Part Number	Description	Quantity	Spares for 10 Instruments	Spares for 100 Instruments	Exchange Policy Applies
1	30000011-806*	Screw, Hex Hd., 8-32 X .31 in	8			
2	30009771-000*	Lockwasher, Size 8	11			
3	30364998-999*	Washer, Flat, Size 8	11			
4	30731586-001	Guide Card	1			
5	30731586-003	Guide, Card	1			
6	30752509-001	Plate, Support	1			
7	30000005-607*	Screw, Bd. Hd., 6-32 X .43 in	4			
8	30006583-000	Lockwasher, Size 6	12			
9	30004906-000*	Nut, 6-32	4			
10	30752709-001	Extension, Support Plate	1			
11	30752284-001	Fan Assembly	1			
12	30752266-001	Pulley	1			
13	30040857-002*	Set Screw, 6-32 X .18 in	2			
14	30000005-804*	Screw, Bd. Hd., 6-32 X .25 in	6			
15	30070598-000*	Lockwasher, Size 8	6			
16	30752279-003	Paper Tractor, Right and Left	1	1	3	
17	30371539-108	E-Ring	5			
18	30752258-002	Chart Platen	1			
19	30752262-001	Tube Assembly,	3			
20	30752260-001	Rod, Square	1			
21	30752274-001	Rod Drive, Tractor	1			
22	30752261-001	Rod, Tractor	1			
23	30752567-001	Paper Guide, Front	1			
24	30752498-001	Paper Guide, Rear	1			
25	30752710-001	Insert	2			
26	30000005-604*	Screw, Bd. Hd, 6-32 X .25 in	5			
27	30606583-000*	Lockwasher, Size 6	5			

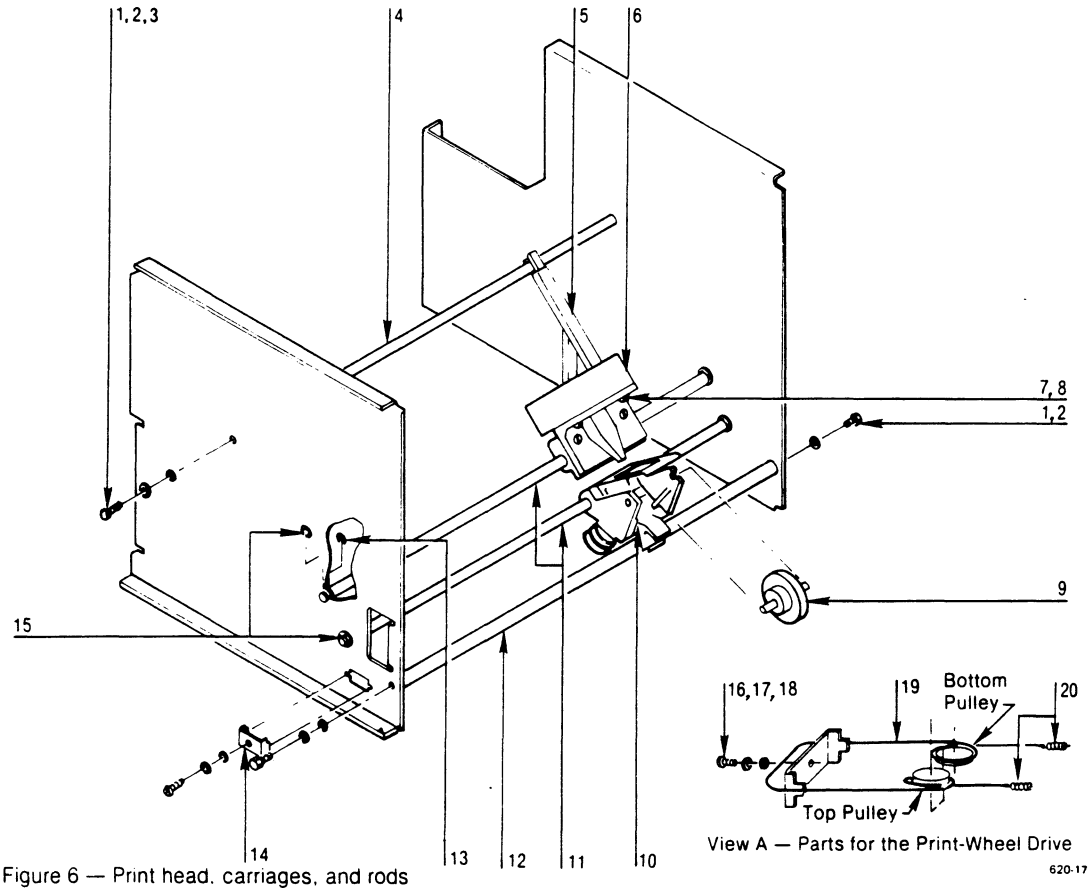

Figure 6 — Print head, carriages, and rods

FIGURE 6

Key Number	Part Number	Description	Exchange Policy Applies	Spares for 100 Instruments	Spares for 10 Instruments	Quantity
1	30000011-804*	Screw Hex. Hd., 8-32 X .25 in	5			
2	30009771-000*	Lockwasher, Size 8	7			
3	30364998-000*	Flatwasher, Size 8				
4	30752297-001	Rod, Print Head Carriage	1			
5	30752302-001	Print Head	1	1	3	
6	30753164-001	Carriage, Print Head	1			
7	30000005-407*	Screw, Bd. Hd., 4-40 X .43 in	2			
8	30000927-000*	Lockwasher, Split, Size 4	2			
9	30752505-001	Print Wheel, One Color	1	1	3	
	30752407-001	Print Wheel, Six Color	1			
10	30752428-001	Carriage, Print Wheel	1			
11	30752296-001	Rod, Carriage	2			
12	30752255-001	Rod, Carriage	1			
13	30371539-112	E-Ring	2			
14	30752316-001	Clip, Cable	1			
15	30752282-001	Ring, Bowed	2			
16	30689796-604*	Screw, Self-Tap, 6-32 X .25 in	1			
17	30006583-000*	Lockwasher, Size 6	1			
18	30004972-000*	Flatwasher, Size 6				
19	30752501-001	Cable Assembly	1			
20	30752318-001	Spring	2			

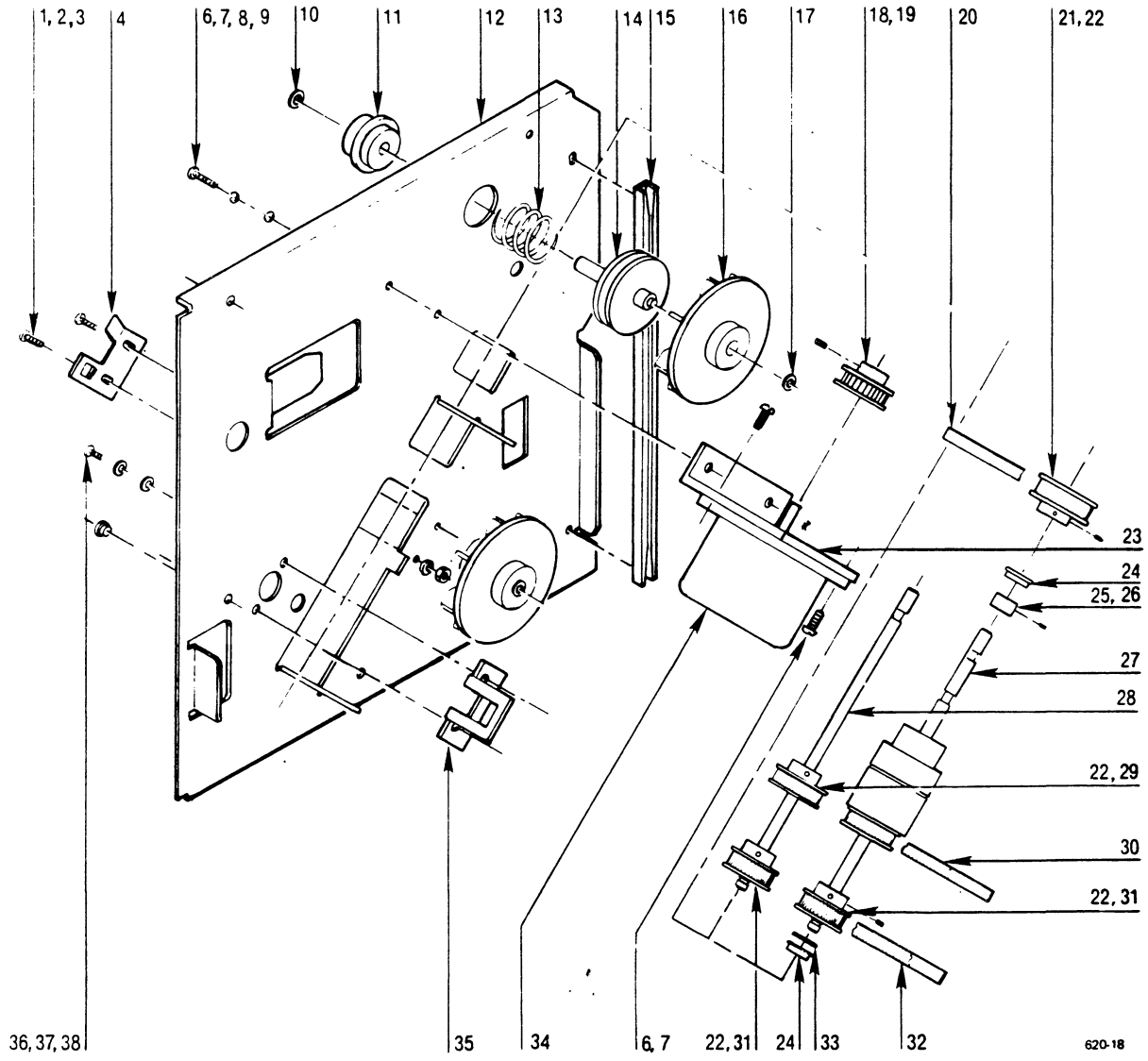

Figure 7 — Left sideplate assembly

FIGURE 7

Key Number	Part Number	Description	Quantity	Spares for 10 Instruments	Spares for 100 Instruments	Exchange Policy Applies
1	30000005-804*	Screw, Bd. Hd., 8-32 X .25 in	2			
2	30364998-000*	Washer, Size 8	2			
3	30070598-000*	Lockwasher, Size 8	2			
4	30752427-001	Plate, Clutch	1			
6	30000005-005*	Screw, Rd. Hd. 10-32 X .31 in.	4			
7	3000914-000*	Lockwasher, Split, Size 10	6			
8	30004971-000*	Washer, Size 10	2			
9	30004911-000*	Nut, Size 10	2			
10	30371041-124	Ring, Retaining	2			
11	30752271-001	Bearing	2			
12	30752507-001	Sideplate, Left	1			
13	30752272-001	Spring	2			
14	30752263-001	Hub, Spring	2			
15	30731586-001	Guide, Card	1			
16	30752434-002	Disc, Left Chart-Roll	2			
17	30371539-108	Ring, Retaining	2			
18	30752295-001	Pulley	1			
19	30040858-001*	Set Screw, Cup Pt., 8-32 X .25 in.	2			
20	30752277-001	Belt	1			
21	30752285-001	Pulley	1			
22	30040857-002*	Set Screw, Cup Pt., 6-32 X .19 in.	6			
23	30752283-001	Bracket, Motor mounting	1			
24	30752408-001	Bearing, Radial-Flanged	2			
25	30354288-000	Collar	1			
26	30040958-001*	Set Screw, Cup Pt., 5-40 X .13 in.	1			
27	30752286-001	Mechanism, Color-change	1	1	3	
28	30752503-001	Shaft, (For one color printing)	1			
29	30752502-001	Pulley	1			
30	30752287-001	Belt	1			
31	30752288-001	Pulley	1			
32	30752289-001	Belt	1			
33	30371524-108	Ring, Retaining	1			
34	30752281-001	Motor, Scan	1	1	3	
35	30752292-001	Bracket, Sensor	1			
36	30000005-604*	Screw, Bd., Hd., 6-32 X .25 in.	2			
37	30368343-001*	Washer, Size 6	2			
38	30006583-000*	Lockwasher, Size 6	2			

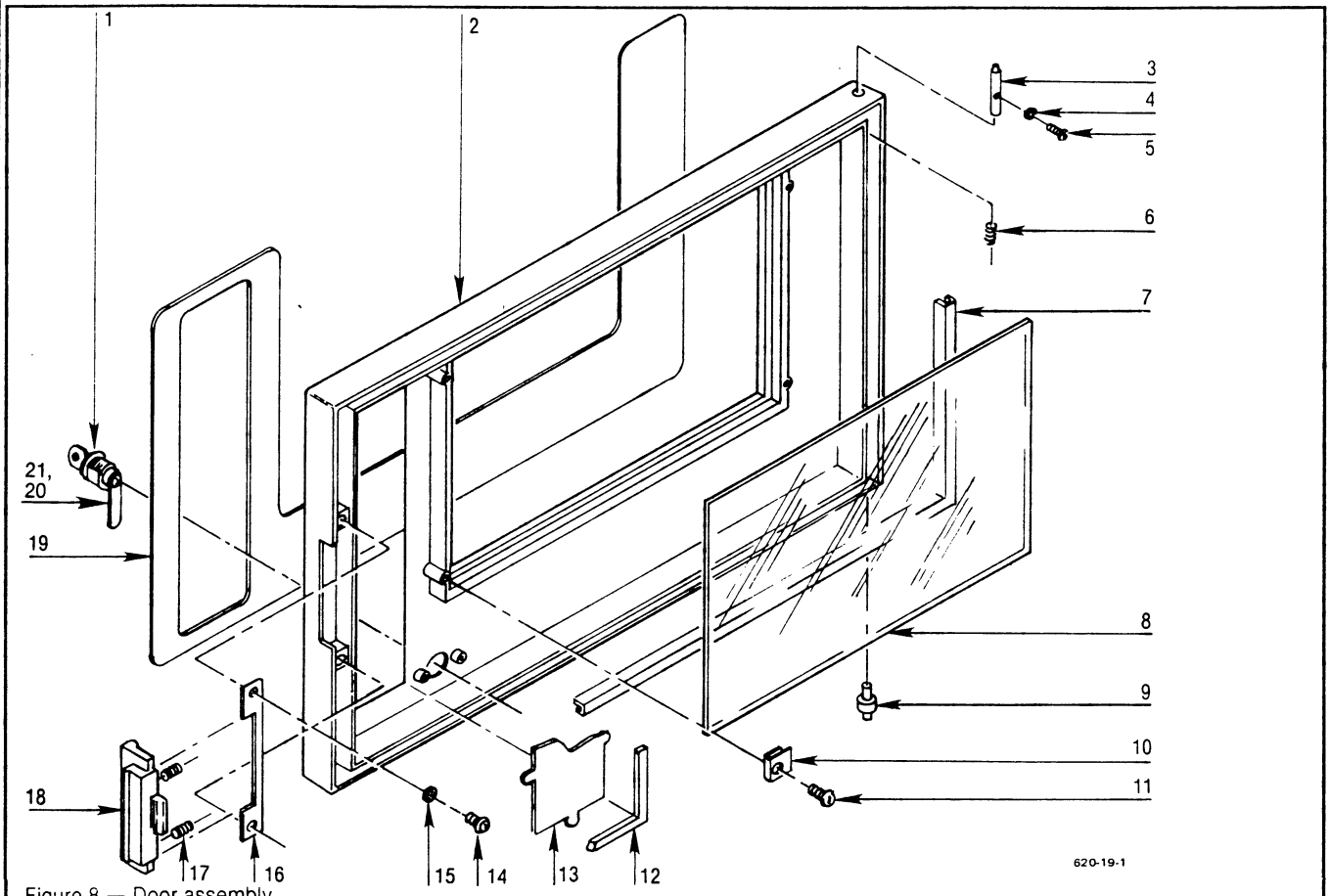

Figure 8 — Door assembly

FIGURE 8

Key Number	Part Number	Description	Quantity	Spares for 10 Instruments	Spares for 100 Instruments	Exchange Policy Applies
1	30752653-001	Lock Assembly	1			
2	30752725-001	Door	1			
3	30752666-001	Pin, Hinge	1			
4	30752722-001	Spring-Washer	1			
5	30000013-608*	Screw, Soc. Hd., 6-32 X .5 in	1			
6	30752732-001	Spring, Pivot	1			
7	30752706-001	Gasket, Door	1			
8	30752518-001	Glass, Door	1			
9	30676888-001	Pin, Hinge	1			
10	30752708-001	Retainer, Glass	7			
11	30000005-603*	Screw, Bd. Hd., 6-32 X .18 in	7			
12	30752707-001	Gasket, Keyboard	1			
13	30753521-001	Cover, Keyboard	1			
14	30000005-604*	Screw, Bd. Hd. 6-32 X .25 in	2			
15	30006583-000*	Lockwasher, Size 6	2			
16	30752664-001	Plate, Doorlatch	1			
17	30752716-001	Spring, Doorlatch	2			
18	30752665-001	Doorlatch	1			
19	30752730-001	Overlay	1			
20	30753366-001	Wave Washer	1			
21	30752686-001	Lock, Cam	1			

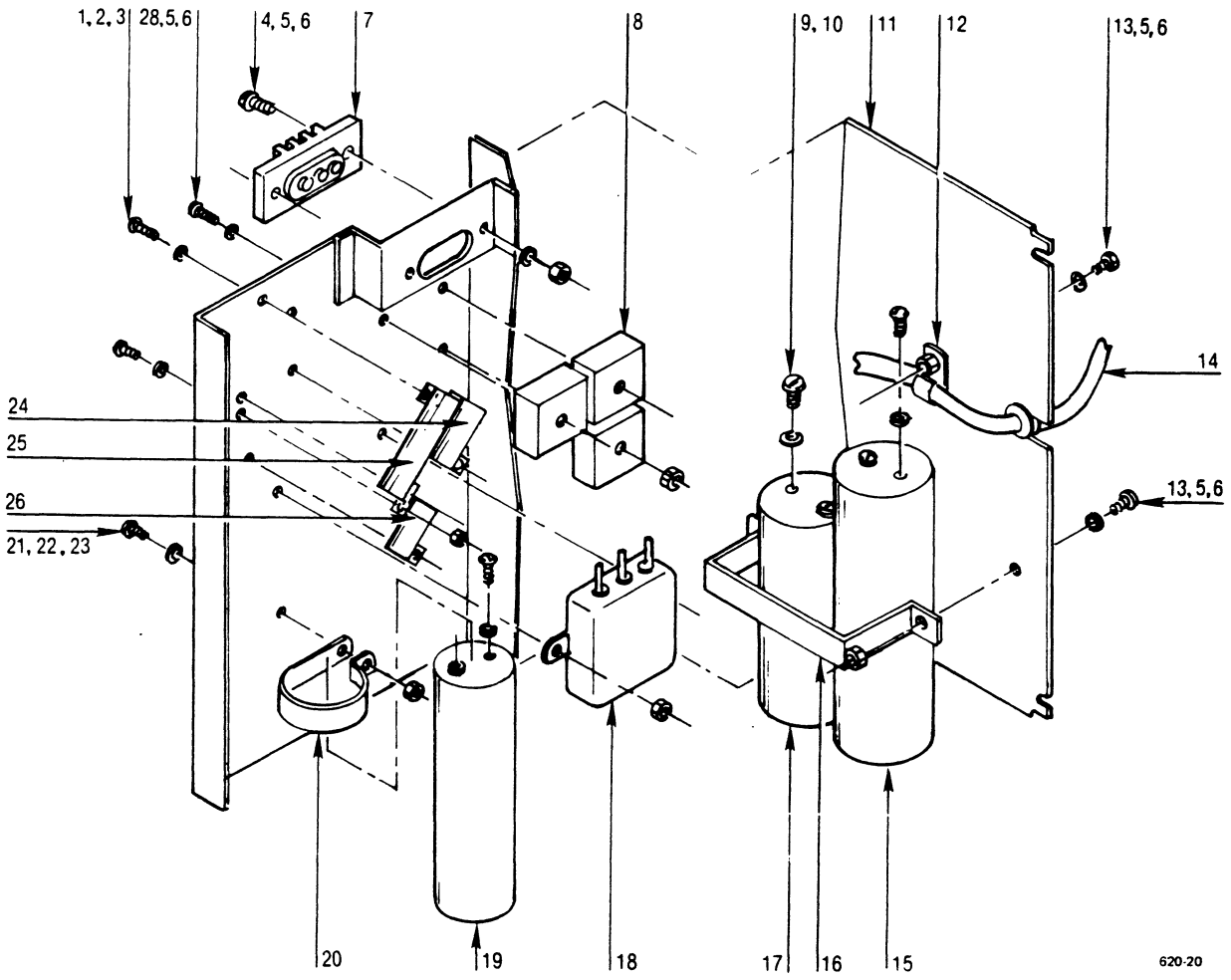

Figure 9 — Filter assembly

FIGURE 9

Find Number	Part Number	Description	Quantity	Spares for 10 Instruments	Spares for 100 Instruments	Exchange Policy Applies
1	30000005-812*	Screw, Bd. Hd, 8-32 X .75 in	1			
2	30070598-000*	Lockwasher, Size 8	1			
3	30004908-000*	Nut, Hex. Hd., 8-32	1			
4	30000005-612*	Screw, Bd. Hd, 6-32 X .75 in	2			
5	30006583-000*	Lockwasher, Size 6	11			
6	30004906-000*	Nut, Hex. Hd., 6-32	11			
7	30751432-001	Block, Terminal	1			
8	30752976-001	Rectifier	3			
9	30000005-006*	Screw, Bd. Hd., 10-32 X .38 in	6			
10	30000914-000*	Lockwasher, Size 10	6			
11	30752703-001	Chassis, Filter	1			
12	30350962-001	Clamp, Cable	1			

FIGURE 9 (continued)

Exchange Policy Applies
Spares for 100 Instruments
Spares for 10 Instruments
Quantity

Key Number	Part Number	Description	Quantity	Spares for 10 Instruments	Spares for 100 Instruments	Exchange Policy Applies
13	30000005-605*	Screw, Bd. Hd., 6-32 X .15	6			
14	30752738-001	Harness	1			
15	30752165-001	Capacitor	1			
16	30753043-001	Bracket	1			
17	30752165-002	Capacitor	1			
18	30732422-002	Filter	1			
19	30752165-003	Capacitor	1			
20	30753044-001	Clamp	1			
21	3000005-406*	Screw, Bd. Hd., 4-40 x .38 in	6			
22	3000927-000*	Lockwasher, Size 4	6			
23	30351600-000*	Nut, Hex Hd, Size 4	6			
24	30752634-004	Resistor	1			
25	30735937-004	Resistor	1			
26	30752634-003	Resistor	1			

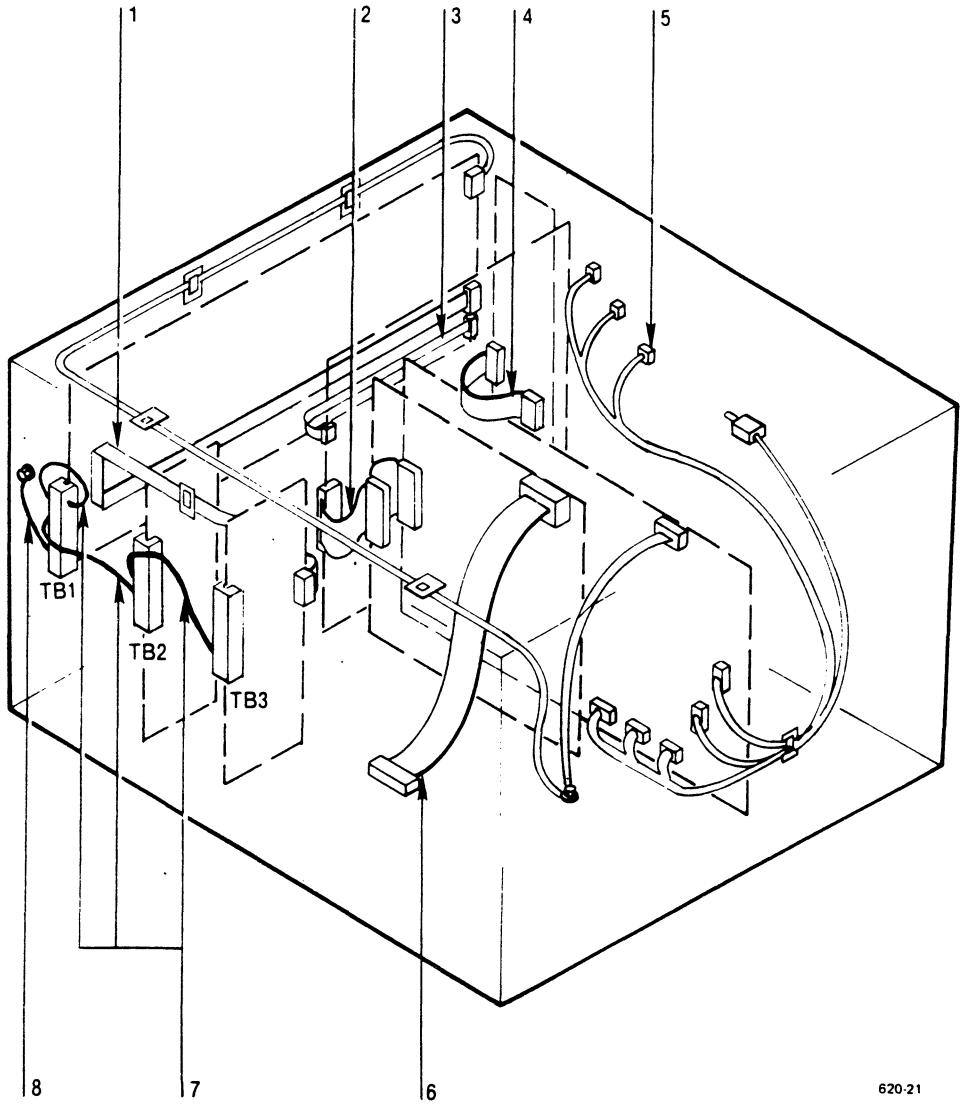

Figure 10 — Cable assemblies

FIGURE 10

Find Number	Part Number	Description	Quantity	Spares for 10 Instruments	Spares for 100 Instruments	Exchange Policy Applies
1	30752647-001	Cable Assembly, Expansion Multiplexer	1			
2	30752645-001	Cable Assembly, Power Supply/Print Control	1			
3	30752646-001	Cable Assembly, Analog/Digital	1			
4	30752644-001	Cable Assembly, Display	1			
5	30752733-001	Cable Assembly, Print-head	1			
6	30752654-001	Cable Assembly, Digital Input/Output	1			
7	30680190-512	Lead Assembly	1			
8	30680384-505	Lead Assembly	3			

Kit Part Number: 30753447-001

Qty.	Part Number	Rating	Description	Used On
1	30351949-012	7.0A	3AG Glass Fuse (Slo-blo)	100, 120 Vac— Power Fuse
1	30351949-011	4.0A	3AG Glass Fuse (Slo-blo)	200, 220, 240 Vac Power Fuse
1	30076014-007	5.0A	3AG Glass Fuse	F13 on PS/PC Board Assembly
1	30680582-011	5.0A	Picofuse	F14 on PS/PC, P.C. Board Assembly
2	30680582-008	1.5A	Picofuse	F1 on PS/PC, P.C. Board Assembly
10	30680582-007	1.0A	Picofuse	F4 through F12 on PS/PC, P.C. Board Assembly
1	30680582-009	3.0A	Picofuse	F1 through F3 on A/D P.C. Board Assembly
2	30680582-004	.25A	Picofuse	F2 on PS/PC, P.C. Board Assembly

Kit Part Number: 30753448-001

Qty.	Part Number	Description	Used On
32	30731551-001	Connector	A/D P.C. Board Assembly and or MUX P.C. Board Assembly to allow the display of measured variables from RTD input types.

Kit Part Number: 30753449-001

Qty.	Part Number	Description	Used On
10	30731554-001	Resistor (250 ohm, 1/4 W, 0.1%)	rear terminals to allow the display of milliampere input types

TABLE 1 — Replaceable Integrated Circuits

Printed Circuit Board Used On	Integrated Circuit Identification	Honeywell Part Number
Power Supply/Print Control	U1	30753932-401
Central Processor Unit	U3	30752513-404
	U7	99001096-604
	U26	30753065-401
	U29	30753933-401
	U48	30753927-401
	U49	30753828-401
	U50	30753653-401
	U51	30753654-401
	U52	30753928-401
	U55	30753833-401
	U62	30753929-401
Analog/Digital	U6	30754049-401

DPR 1500
Digital Process Reporter

Model Selection Guide

Instructions

- Select the desired Key Number. The arrow to the right marks the selections available.
- Make one selection each from Table I and Table II, using the column below the proper arrow. Select as many Table III options as desired. A dot (•) denotes unrestricted availability.
- A complete Model Number must have the designated number of digits in each table.

Key Number	I	II	III (Optional)
_ _ _ _ _ -	_ -	_ _ _ _ -	_ _ . _ _ _ _

			Selection	Availability	
Key Number	**Design Type**	**Analog Channel**			
	Single Color	14	DR114	↓	
		22	DR122	↓	
		30	DR130	↓	
	Multi-Color	14	DR614		↓
		22	DR622		↓
		30	DR630		↓
Table I	Actuation	Standard	0	•	•
		Resistance Temperature Detector	1	•	•
Table II	Operating Voltage (ac)	120	12 _	•	•
		220	22 _	•	•
		100	10 _	•	•
		200	20 _	•	•
		240	24 _	•	•
	Hertz	50	_ _ 5	•	•
		60	_ _ 6	•	•
Table III	No Selection		00	•	•
	Digital I/O		02	•	•
	Door Lock and Keyboard Cover		04	•	•

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Honeywell

DPR 1500
Digital Process Reporter

Drawing Index

TABLE OF CONTENTS **Drawing Number**

Internal Wiring Diagram 30752506-000

Schematic—Transformer and Filter Assembly 30753149-000

Process Control Division, 1100 Virginia Drive, Fort Washington, PA 19034

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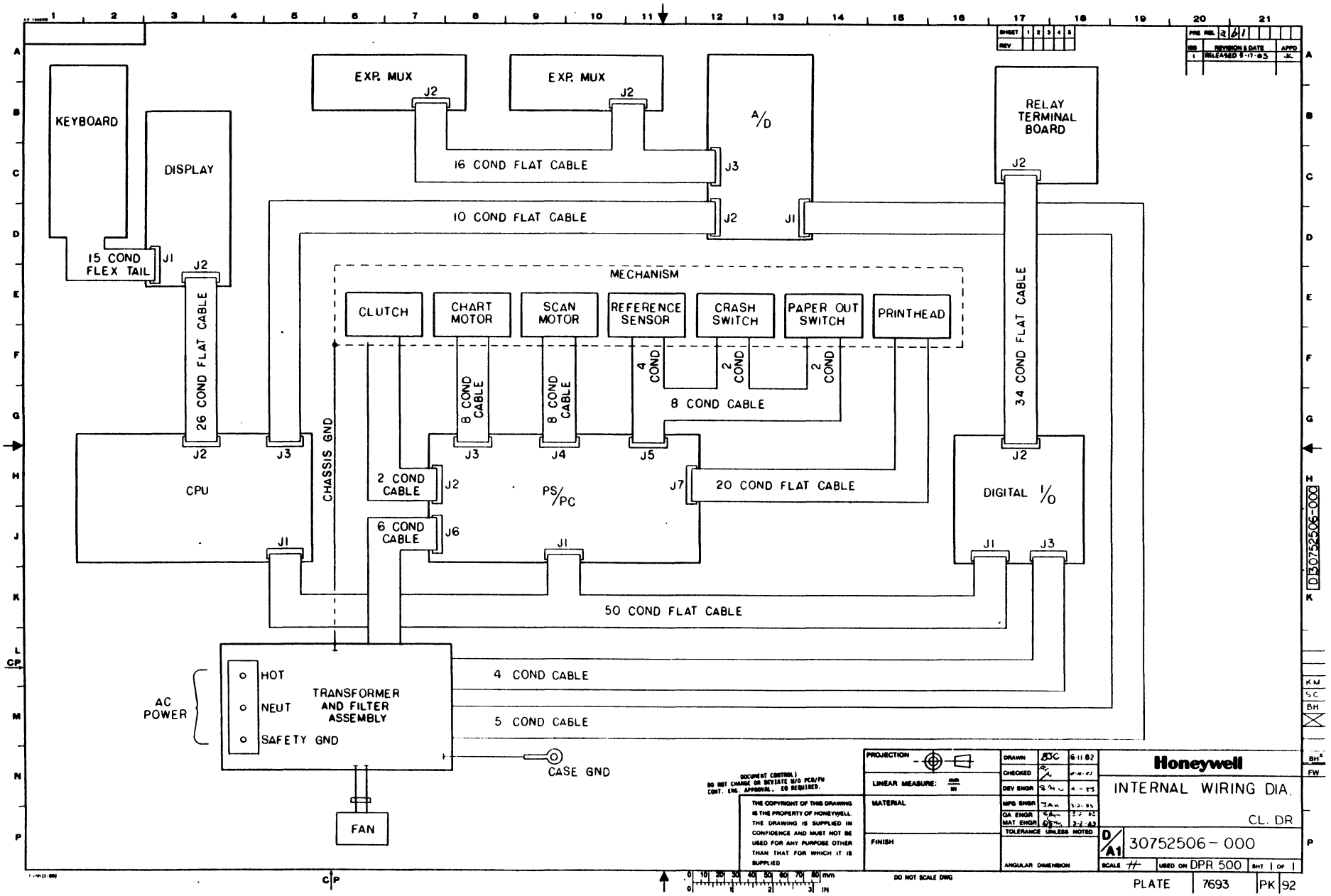
KEYBOARD
DISPLAY
15 COND FLEX TAIL
J1
J2
26 COND FLAT CABLE
EXP. MUX
EXP. MUX
16 COND FLAT CABLE
10 COND FLAT CABLE
A/D
RELAY TERMINAL BOARD
34 COND FLAT CABLE
MECHANISM
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CRASH SWITCH
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4 COND
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2 COND
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8 COND CABLE
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CPU
2 COND CABLE
6 COND CABLE
PS/PC
20 COND FLAT CABLE
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AC POWER
HOT
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SAFETY GND
TRANSFORMER AND FILTER ASSEMBLY
4 COND CABLE
5 COND CABLE
CASE GND
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MAT ENGR
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INTERNAL WIRING DIA.
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D/A1 30752506-000
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SHT 1 OF 1
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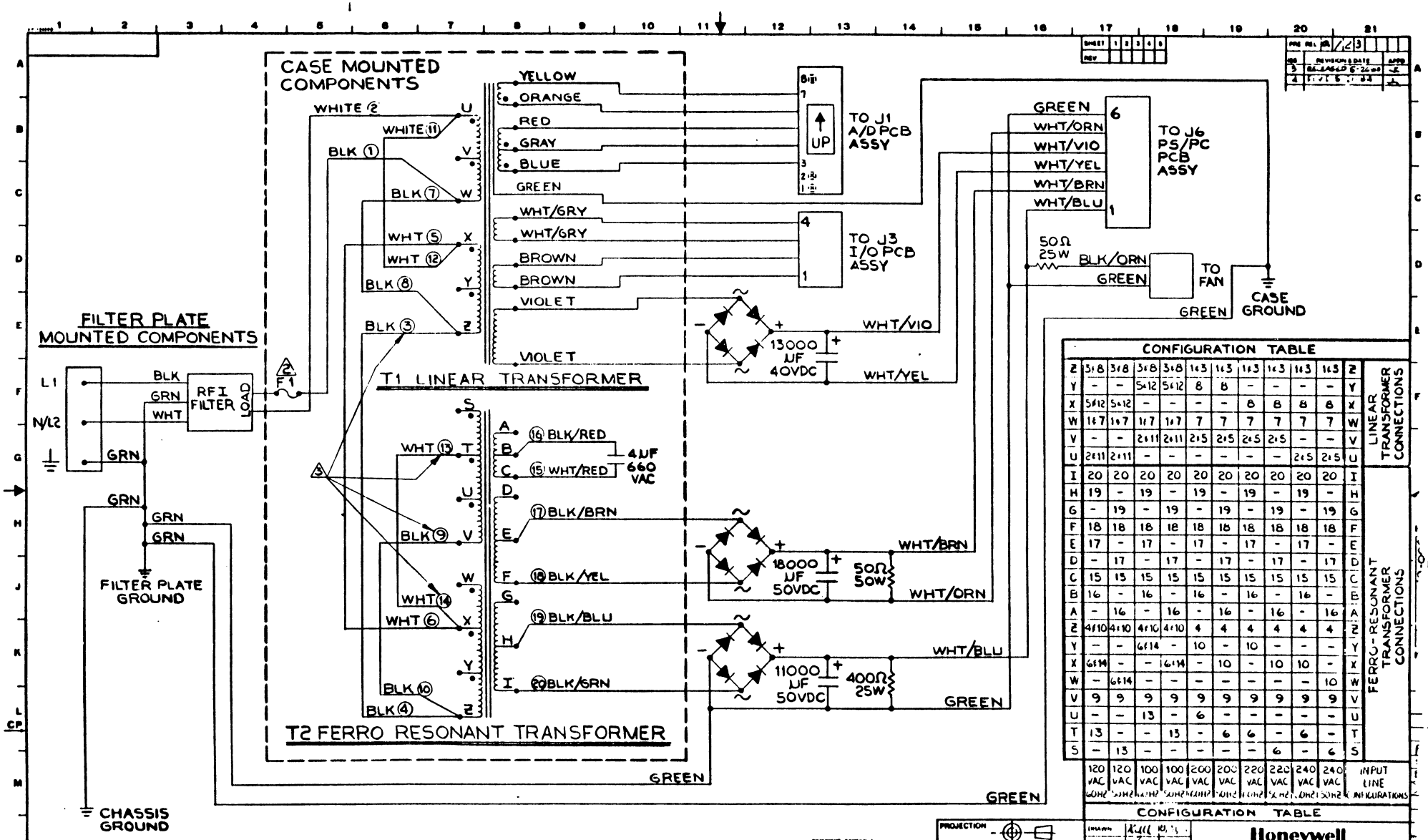

CONFIGURATION TABLE

	120 VAC 60HZ	120 VAC 50HZ	100 VAC 60HZ	100 VAC 50HZ	200 VAC 60HZ	200 VAC 50HZ	220 VAC 60HZ	220 VAC 50HZ	240 VAC 60HZ	240 VAC 50HZ	
Z	3↔8	3↔8	3↔8	3↔8	1↔3	1↔3	1↔3	1↔3	1↔3	1↔3	Z
Y	–	–	5↔12	5↔12	8	8	–	–	–	–	Y
X	5↔12	5↔12	–	–	–	–	8	8	8	8	X
W	1↔7	1↔7	1↔7	1↔7	7	7	7	7	7	7	W
V	–	–	2↔11	2↔11	2↔5	2↔5	2↔5	2↔5	–	–	V
U	2↔11	2↔11	–	–	–	–	–	–	2↔5	2↔5	U
I	20	20	20	20	20	20	20	20	20	20	I
H	19	–	19	–	19	–	19	–	19	–	H
G	–	19	–	19	–	19	–	19	–	19	G
F	18	18	18	18	18	18	18	18	18	18	F
E	17	–	17	–	17	–	17	–	17	–	E
D	–	17	–	17	–	17	–	17	–	17	D
C	15	15	15	15	15	15	15	15	15	15	C
B	16	–	16	–	16	–	16	–	16	–	B
A	–	16	–	16	–	16	–	16	–	16	A
Z	4↔10	4↔10	4↔10	4↔10	4	4	4	4	4	4	Z
Y	–	–	6↔14	–	10	–	10	–	–	–	Y
X	6↔14	–	–	6↔14	–	10	–	10	10	–	X
W	–	6↔14	–	–	–	–	–	–	–	10	W
V	9	9	9	9	9	9	9	9	9	9	V
U	–	–	13	–	6	–	–	–	–	–	U
T	13	–	–	13	–	6	6	–	6	–	T
S	–	13	–	–	–	–	–	6	–	6	S

LINEAR TRANSFORMER CONNECTIONS

FERRO-RESONANT TRANSFORMER CONNECTIONS

INPUT LINE CONFIGURATIONS

CONFIGURATION TABLE

NOTES:

1 - TRANSFORMER CONFIGURATIONS ARE SHOWN FOR 120V 60HZ. FOR OTHER CONFIGURURATIONS SEE CONFIGURATION TABLE.

2 - FOR 100 AND 120 VOLT CONFIGURATION, F1 ≡ 7A. FOR ALL OTHER CONFIGURATIONS, F1 ≡ 4A

3 - NUMBERS IDENTIFY JUMPER LEAD CONNECTION PER CONFIGURATION TABLE.

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FINISH

DRAWN

CHECKED

DEV ENGR

MFG ENGR

QA ENGR

MAT ENGR

TOLERANCE UNLESS NOTED

ANGULAR DIMENSION

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SCHEMATIC TRANSFORMER AND FILTER ASSEMBLY CL/DR

D/A1 30753149-000

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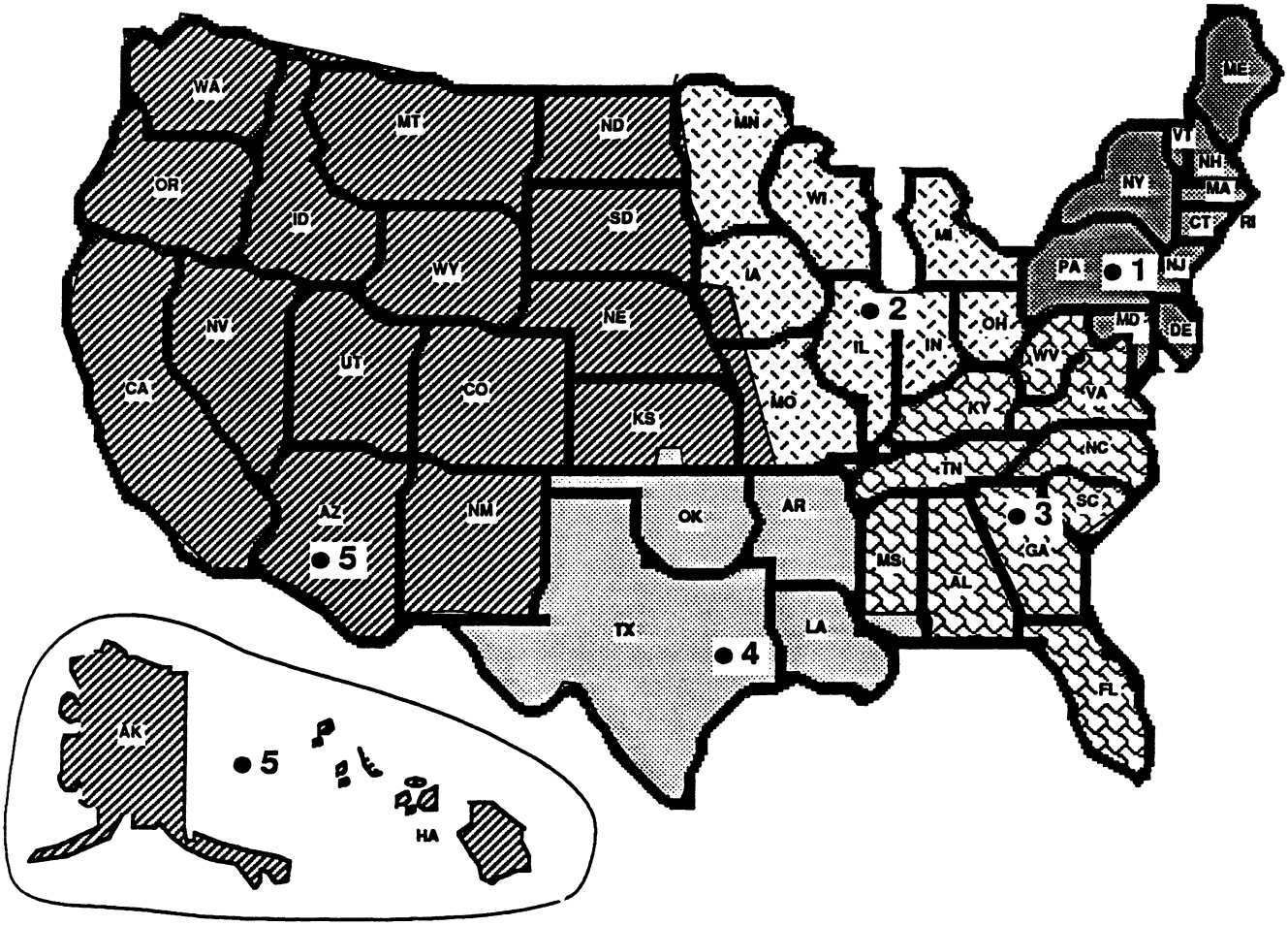

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